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TEZONAPA BOTANICAL STATION

[misc. publ]

ORGANIZATION AND OBJECT

—BY—

PEHR OLSSON-SEFFER, Ph. D.

DIRECTOR

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PRINT OF
THE MEXICAN MINING JOURNAL
MEXICO, D. F.

FOREWORD.

The Tezonapa Botanical Station is a private institution for scientific investigation of the vegetable products of México and of the tropical industries of this country. In response to a number of requests it has been considered that a brief sketch of the organization and scope of this institution might prove of interest to many persons who have come into touch with the work here accomplished,

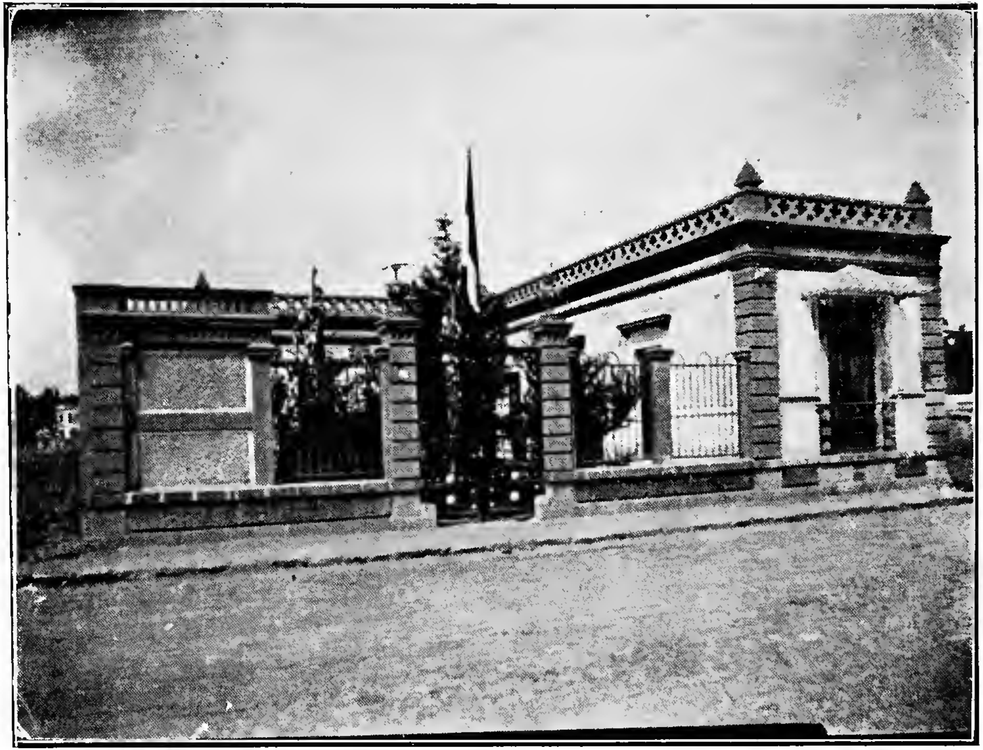

FIG. 1. TEZONAPA BOTANICAL STATION.

ZACUALPA BOTANICAL STATION AND RUBBER LABORATORY.

The question of the need of a special experiment station for investigation of the rubber problems confronting the planters in Mexico and Central America was first discussed in the public press in Mexico during the summer of 1905, subsequent to a visit to the rubber districts by the present writer. Many planters expressed their interest in the matter and a few declared themselves prepared to financially assist such an undertaking; The Directors of one of the oldest Mexican rubber planting companies, La Zacualpa Rubber Plantation Company, of San Francisco, California, then decided to realize the plan, and in September, 1905, the writer was commissioned to establish and take charge of such a station, to be located on La Zacualpa estate, in the district of Soconusco, State of Chiapas, Mexico.

This estate belonged to the above mentioned company, which agreed to furnish the necessary funds for the experiment station.

During the months of October and November the writer was occupied in purchasing and shipping to Mexico the necessary apparatus, supplies and other material for the station, and on the last day of the year he arrived via Guatemala in the town of Tapachula in Southern Mexico.

The material for the station had been shipped via Acapulco to the Port of San Benito, and, as usually happens, the shipment was considerably delayed and did not reach San Benito before late in January.

While the Directors of the Company were friendly to the experiment station idea and did everyting possible to assist those connected with the institution, it soon appeared that the local officers of the Company were adverse and exerted themselves to put obstacles in the way. Under such conditions it was rather difficult to get matters in shape for systematic work.

During June, 1905, when the writer visited La Zacualpa plantation under intructions from the Directors of the Company, it had been arranged that an experimental plot for rubber be maintained. About two acres of land which had previously been planted with rubber, but which had not succeeded, were again planted under the writer's instructions. Detailed notes were taken about each individual plant, and it remained for the manager to keep the plot clean from weeds. Upon the writer's arrival on the plantation in January, 1906, it was found that the experimental plot had not been attented to, and that the planting was of no value.

During the fall of 1905 the Directors of the Company instructed the resident manager by cable to begin immediately the construction of a house for the experiment station. Nothing had been done, however, before the writer's arrival. A small house was then begun and considerable time had to be given by the writer and his assistant to supervision of the contruction.

The building consisted of three rooms, but by dividing and enclosing the rear verandah two small additional rooms were obtained.

The library room of the station was furnished with crude tables and shelves of rough sawn lumber, windows were fitted in and the room served its purpose well. The library consisted, in the beginning, of the writer's private books and pamphlets, about 4,000 in number. During the following month a few standard books were purchased and a considerable number of bulletins and serial publications were added to the collection, thanks to the kindness of many of the writer's scientific friends. Special mention should be made of the complete set of Reports from Missouri Botanical Garden and a boxfull of books from the New York Botanical Garden.

Another room at the experiment station was equipped for botanical work. A high power compound microscope with all accessories and reagents, plant physiological apparatus of various kinds, etc., were in constant use.

Necessary equipment for bacteriological work had also been purchased, but the time permitted very little work in this branch.

A large chemical room was well equipped for analytical work, and the stock of chemicals was fairly complete for the purpose of the laboratory. Necessary centrifugal apparatus, stills, extractors, etc., as well as analytical balances, desiccators, drying oven, Kjeldahl apparatus for nitrogen determination and the ordinary amount of glassware were included in the equipment.

Detailed meteorological observations were made at the station, standard instruments being used, and the instructions of the United States Weather Bureau being followed.

A photogrophic dark room was constructed on part of the rear verandah. This, the chemical laboratory and the botanical room were piped for running water. Pipes were also laid for watering part of the experimental plots in the rear of the buildings, but, although a well was sunk, neither pump nor tank were ever supplied as promised. On this account it proved very difficult to carry on the chemical work to full satisfaction, as all the water used had to be carried in buckets into the building.

Back of the main building a small structure was erected containing two rooms, one for a store-room and the other for a blacksmith and carpenter shop. The latter was later used as a kitchen, as the separate building, which according to agreement was to be erected as a residence for the director never materialized.

Approximately four acres of ground were used for experimental plots, but the main work and observations in regard to rubber was done in the field on the plantation. All ages of rubber trees, from a few days to twenty years old, were thus studied. Besides *Castilla*, *Ficus*, *Hevea* and *Manihot* rubbers, many other economic plants of the tropics were grown in the experimental plots, but the observations on these covered only the younger stages. The influence of various fertilizers on rubber plants was studied in detail, and some very interesting results were obtained. Experiments were made on different methods of planting seeds, stakes, roots and other parts of rubber trees, and many valuable observations on propagation were noted.

Series of physiological experiments on *Castilla* were conducted in the laboratory. The influence of different colored lights and of poisonous gases on *Castilla* seedlings were studied. Microscopic investigations of the tissues of different organs of *Castilla* and *Manihot glaziovii* were carried out. The effect of gravity on the development of the roots was studied, as well as transpiration phenomena, both in the field and laboratory.

The temperature of the *Castilla* tree under varying atmospheric conditions was studied, and the rate of growth was recorded in several series of experiments.

The selection of rubber seed by specific gravity and other methods was studied carefully, and seed testing experiments were conducted. Research investigations on rubber plants, such as the effect of copper on foliage and assimilation of nitrogen of the tree, were carried out.

The proper collection of latex, its preservation and manufacture into commercial rubber from a practical as well as scientific viewpoint was a special feature of the work at the station. All the stages in the manufacture of crude rubber and all problems of rubber house work were considered. Over six hundred different experiments in coagulation of latex were made. The enzymology of *Castilla* latex was studied and some very interesting results obtained. In this connection experiments and studies of micro-oganisms, ferments and fungi, were carried out. Having a fairly well equipped working laboratory at our disposal, we were thus able to take up many varied lines of investigation.

The soils in the district, especially those which experience had proven suitable for rubber culture, were analysed chemically and mechanically.

Besides the above works measurements of many thousands of rubber trees were taken at intervals, and avaluable series of observations in this regard secured.

As no provisions had been made for the publication of the results obtained at the station, and as no funds were available for the purpose, no publications were issued from the station except a small bulletin on Rice culture prepared by the present writer. Privately several papers were published containing data on rubber culture in Mexico.

While the scientific and practical work of the station was pushed with vigor, the living conditions became unbearable on account of the animosity of the Company's local officers, who were adverse to any control of the work that might result from the investigations conducted at the station. In August, the writer, therefore, personally laid the details of the conditions on the estate before the Directors in San Francisco. This lead to certain changes in the local management, and to renewed activity in planting and other operations on the estate. The recommendations made for improvements of the estate were carried out to a certain extent, but, generally speaking, in a half-hearted manner. The necessity of thorough drainage had been emphasized by the writer in every report to the Directors since July, 1905, and a system of draining of the rubber lands was gradually carried through to the evident benefit of the rubber stand. The method of preparing rubber used on this and on most other Mexican estates is the one developed during the work at La Zacualpa Botanical Station and Rubber Laboratory, and patented by the writer in 1907. The recommendations made for protection against forest fires passed unheeded, however, and several hundred acres covered with rubber trees have since been destroyed by fire on the estate.

Under intructions from the Directors of the Company the writer left the station in charge of the Assistant, Mr. Rolf Olsson-Seffer, and proceeded to the Orient for the purpose of studying the progress in rubber culture. It the course of this journey, Java, Sumatra, Straits Settlements, Federated Malay States and Ceylon were among the rubber producing countries visited. In 1907, upon returning from this journey, the writer rendered a report to the Directors of the Company. Parts of the report have been published this year in the American Review of Tropical Agriculture.

After a visit to La Zacualpa in July, 1907, the writer did not again take up residence on the estate, but carried on the scientific work on rubber in his private laboratory in Mexico City, making visits of inspection to the Company's rubber and coffee estates in Chiapas.

On November 30th, 1908, the three years agreement with the Zacualpa Company was at an end, and on that day La Zacualpa Botanical Station and Rubber Laboratory ceased to exist.

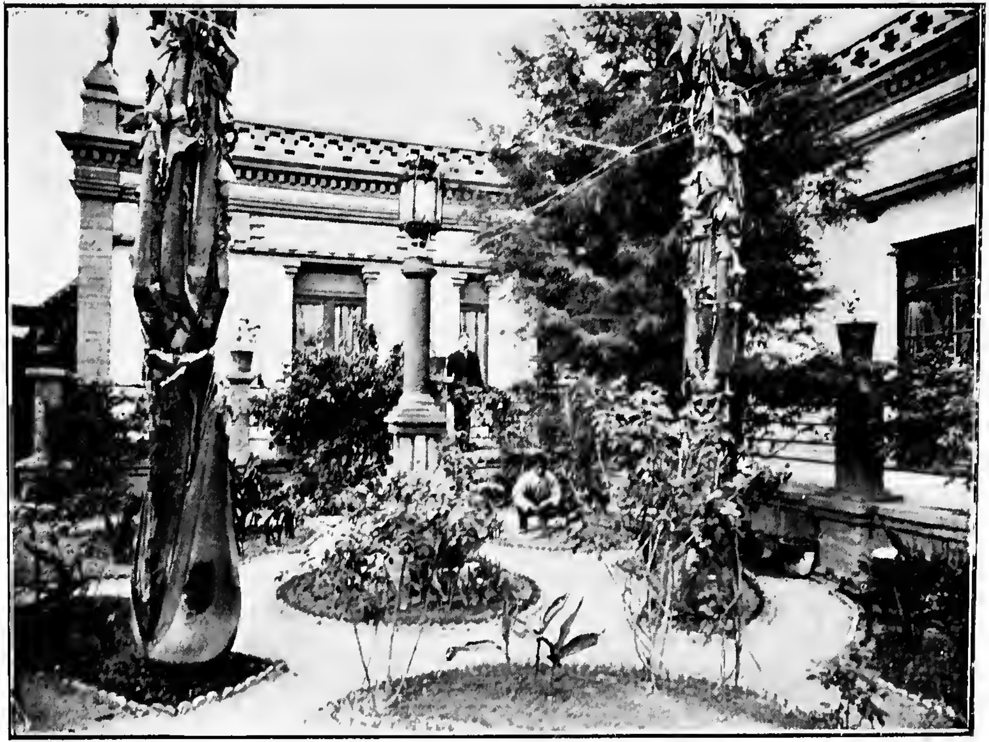

FIG. 2. GARDEN AT THE STATION.

TEZONAPA BOTANICAL STATION.

In the fall of 1908 the rubber planters of this country organized into a Rubber Planters' Association of Mexico, and this society at first showed a considerable activity. Several meetings were held and questions of vital interest to the planting community were discussed. One of these questions was in relation to the establishment of a co-operative system of experiments on rubber culture and other tropical industries. It was planned that a central experiment station and laboratory be established in Mexico City for chemical study of rubber latices, and that ten different experimental stations be established on a number of rubber plantations in various parts of the country. The owners of these plantations were willing to furnish free of cost the necessary land, labor and superintendence, and they agreed to be subject to the direction of the staff of the Rubber Planters' Experiment Station, in so far as the experimental plots were concerned.

The rubber planters hoped that the Mexican Government would assist in this undertaking by giving a small subsidy, and an application to this effect was submitted to the Secretary of Fomento. The planters were advised that the Government could not at the time give the subsidy asked for, and in consequence the entire plan fell through.

The present writer, being heavily interested in tropical agriculture in various parts of Mexico, then decided to continue the work carried on at La Zacualpa Botanical Station, and a private laboratory was established for this purpose in Mexico City, while the field work and practical experiments were conducted on an estate in the neighborhood of Tezonapa Station, on the Vera-Cruz & Isthmus Railroad, in the State of Vera-Cruz.

The first home in Mexico City of the laboratory was a building on 4ª Calle Bucareli, but after eighteen months in this location, another building, situated in the suburb of Tacubaya, not far from Chapultepec Park, was secured on a several years contract, and in May of the present year, upon the return of the writer from Europe, the work of installing the station in its new quarters was commenced. The location is in many ways advantageous, being away from street traffic and subsequent noise and dust, but at the same time within two minutes walk from the electric tramway at Puente Station.

In the building there is a working room for the Director, a morphological laboratory, supplied with a high power microscope with oil immersion lenses, reagents, dissecting stand, camera obscura, microtome, turntable, and accessories for general botanical work; a plant physiological laboratory with necessary apparatus for work in experimental plant physiology; a sample room, in which are stored specimens of different Mexican products to be examined at the station; a store-room for glassware and other material; a balance room with chemical balances and a supply of glassware; a chemical laboratory fairly well equipped for ordinary analytical work; a photographic dark room; and a library room. All these are fitted with necessary shelves and tables. A small investigator's room is supplied with polariscope and other necessary equipment for special work.

In the rear of the building a small factory for rubber work has been installed. The machinery consists of a washing machine with diamond cut rollers from David Bridge & Co., an Alsing pebble mill with accessories, a disintegrator, a vacuum drying pan with pump from Francis Shaw & Co., a vulcanizing pan and a small steam boiler. A rubber smoking machine of the Olsson-Seffer patent is in course of erection. A hand steel press and a triplex pump are also installed in the factory. The motive power is supplied by means of a five H. P. electric motor, the current being obtained from the Mexican Light & Power Co.

A battery of small tanks is installed for settling and mixing. The entire factory has a concrete floor and is covered by a galvanized iron roof. This experimental factory is an accessory to the rubber factory to be installed by the Standard Rubber Corporation of Mexico, Ltd., in the immediate neighborhood.

The water supply is secured from a well on the grounds, and is stored in a series of tanks on the roof of the building. The latter is lighted throughout by electricity.

The shop is supplied with necessary blacksmith's, carpenter's and mechanic's tools for ordinary and precision wook.

A small garden and a number of glass-cases give opportunity for keeping fresh plants on hand for study. A small lodge for the attendant is included in the institution.

A herbarium of some 1,200 sheets belonging to the station will be placed in special cases in one of the rooms as soon as circumstances permit.

SCOPE OF WORK.

The activities of the members of the staff for the last few months have been directed principally to the collection of data connected with the rubber industry, and special experiments have been conducted for completion of work upon problems that have been studied in previous years. Acclimatisation experiments have been and are being carried out on various properties in different parts of Mexico, which are under the direction of the staff of the station.

The scope of the institution and the directions in which research is here conducted is of a varied character, but is strictly devoted to different branches of tropical agriculture in Mexico.

As will be seen from the more detailed information of this work on the following pages, rather abstract investigations in plant physiology and anatomy are being carried out, but at the same time practical work and applied science are the main objects of the station.

We are hoping for a broader recognition of the usefulness of scientific research in tropical agriculture, not only in the laboratory for academic purposes, but as an indispensable factor in its relation to the progress of the planting industries.

Co-operation with other institutions, and with individual investigators has been very successful, and we hope that this will be extended. Special mention should be made of the most valuable assistance rendered by Professor William Trelease, of the Missouri Botanical Garden, by determining plants collected in the field and used in our laboratories for chemical investigation.

Among scientific visitors, who have inscribed their names in the visitor's book at the station may be mentioned Professor A. Hitchcock, of the United States Department of Agriculture, who visited Mexico for studies in agrostology, and Mr. Henry Thomson, of the Missouri Botanical Garden, who spent several monts in Mexico making collections for his institution.

In co-operation with the station Mr. David Crawford, of Pomona College, made entomological collections in the south of the Republic, during part of the summer.

BOTANICAL STUDIES.

The examination of specimens and material for purely systematic purposes is only receiving a subordinate attention, the primary object of the work being pure and applied botany as referring to tropical agriculture. The study of plant diseases is taken up as circumstances require. Among the special investigations that have been carried out during the last years at the station, the following may be mentioned.

Ecology of Castilla.—(By Dr. Pehr Olsson-Seffer).

This subject has been studied in the field and laboratory, since 1905, and the data obtained are almost ready for publication.

The Grand Period of Growth in Castilla.—(By Dr. Pehr Olsson-Seffer).

In the course of the various investigations of *Castilla* rubber this subjet presented itself, and some interesting information was secured at La Zacualpa, at Tezonapa, and on Doña Maria Estate in Chiapas.

The Breathing of Castilla Seeds Exposed to External Pressure.—(By Dr. Pehr Olsson-Seffer).

Experiments were begun at La Zacualpa, and have been continued this year in Mexico.

The Temperature of Castilla elastica.—(By Dr. Pehr Olsson-Seffer).

Data were collected at La Zacualpa, and additional records have been obtained from time to time.

Studies of Castilla Seedlings.—(By Dr. Pehr Olsson-Seffer).

Specimens and records were collected at La Zacualpa, and the subject is now being worked up for publication, Mr. Lillieskold having finished the preparation of the illustrations.

Influence on Root-growth by Surrounding Medium.—(By Dr. Pehr Olsson-Seffer).

The study of *Castilla* seedlings and of root development of other tropical plants led to this subject and some interesting data have been collected.

On the Laticiferous Tissues in the Stem of Certain Jatrophas.—(By Dr. Pehr Olsson-Seffer).

Specimens have been collected on the Isthmus of Tehuan tepec and in various other localities, and the material is being worked up in connection with the study of the rubber bearing latex of certain species of this genus.

The Development, Structure and Affinities of the Genus Cecropia.—(By Dr. Pehr Olsson-Seffer).

A study of the life history of the Mexican Cecropias was begun years ago and this work has been continued during the last year.

The Influence of Poisonous Vapors on Castilla Seedlings.—(By Dr. Pehr Olsson-Seffer).

Experiments in this direction were begun at La Zacualpa, and the subject has been recently taken up for further investigation.

Some Diseases of Rubber Trees.—(By Dr. Pehr Olsson-Seffer).

The question has frequently come under notice, and records have been kept with the idea of their ultimate publication.

Estimated Changes of Dry Weight of Castilla Leaves.—(By Dr. Pehr Olsson-Seffer).

Data from La Zacualpa have been corrected and are ready for publication at an early date.

Studies of Stomata of Tropical Plants.—(By Dr. Pehr Olsson-Seffer).

During the work in the Tropics this subject early suggested itself in connection with transpiration phenomena. Data have been collected from time to time.

Correlation in the Growth of Roots and Shoots of Castilla.—(By Dr. Pehr Olsson-Seffer).

This interesting study of the early development of *Cas-*

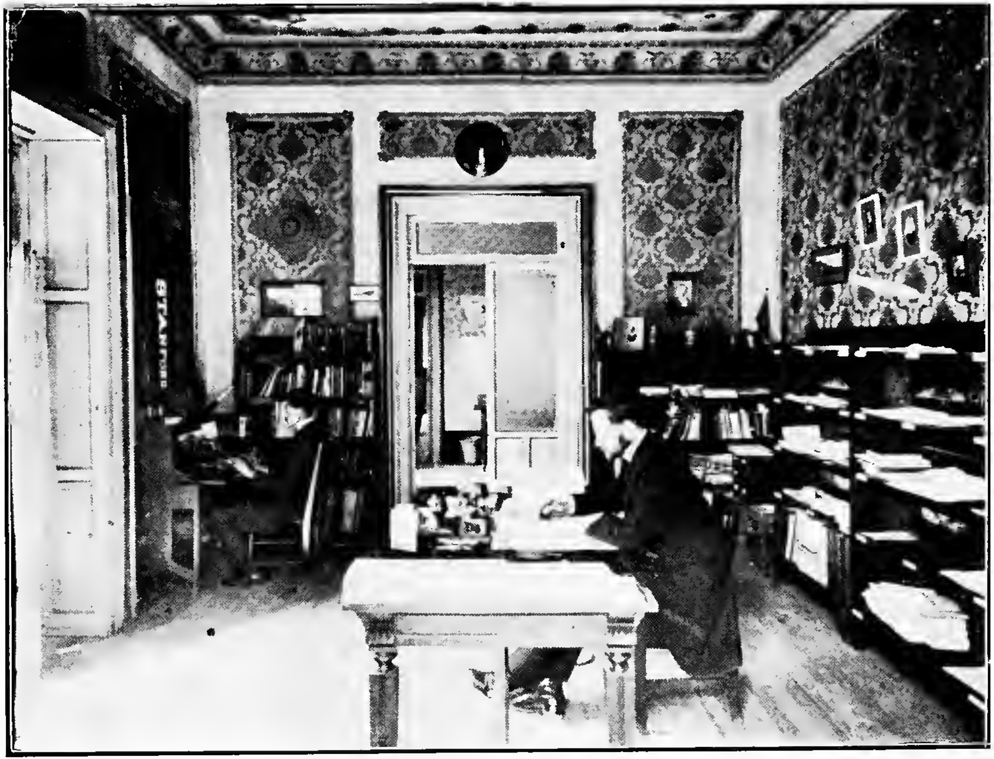

FIG. 3. DIRECTOR'S OFFICE,

tilla seedlings resulted in some very interesting observations, which are now being prepared for publication.

On the Influence of Wound Stimuli on the Formation of Adventitious Buds on Castilla elastica.—(By Dr. Pehr Olsson-Seffer).

In connection with the tapping process of rubber trees it was noticed that a number of adventitious buds developed, and this was made the subject of special investigation.

Ecological and Morphological Studies of Root Hairs.—(By Dr. Pehr Olsson-Seffer).

The continued root studies led to an investigation of root hairs in the Tropics, and a large amount of information has been gathered.

Leaf Variation in the Tropics.—(By Dr. Pehr Olsson-Seffer).

Observations in the tropical forests of the leaf variation are of considerable interest and field studies as well as laboratory experiments have been conducted.

Study of Bombax Ceiba L.—(By Mr. Runar I. Olsson-Seffer).

Field investigations have been made and material for detailed laboratory studies has been collected.

CHEMICAL INVESTIGATIONS.

The chemical work has mainly been research upon various Mexican rubbers, vegetable waxes, oil producing seeds and tan barks. Mr. Wannag and the writer did most of the work until May of this year, and since, Mr. Kaye and Dr. Dolley. The latter's work comprises investigations of the chemical properties of many different products of the country. Among special studies undertaken during the last year may be mentioned the following:

Analyses of Rubber Samples from Mexico.—(By Dr. Pehr Olsson-Seffer).

Numerous samples of various Mexican rubbers have been analysized from year to year and a small paper upon the subject has been prepared.

The Action of Formaldehyde in the Preservation of Rubber Latex.—(By Dr. Pehr Olsson-Seffer).

Formaline being commonly used for preservation of *Castilla* and other latices, investigation on the influence of this chemical was begun, and some interesting data have been secured.

Assimilation of Nitrogen by Castilla.—(By Dr. Pehr Olsson-Seffer).

In the course of the rubber work this subject was taken up at La Zacualpa, and has afterwards been continued in Mexico City.

Chemical Constituents of some Rubber Soils.—(By Dr. Pehr Olsson-Seffer).

Analyses of rubber soils from various parts of Mexico, and from Hawaii, Java, Singapore, Malaya, and Ceylon have been made, and some interesting comparative results have been obtained.

Study of Castilla Latex.—(By Mr. Frederick Kaye).

This work was undertaken in May of this year, and a preliminary paper has been prepared for publication.

AGRICULTURAL EXPERIMENTS.

The rubber experiments have been confined to tapping experiments on several estates and to pruning of the rubber trees.

In coffee culture a series of experiments on the result of pruning and fertilizing have been conducted during the last year.

Experiments with various fibre plants and their culture have been carried on, and some interesting results obtained.

A series of experiments upon rice culture has been undertaken and is being continued.

Cotton experiments have been made in various parts of the country in co-operation with the Station, especially with the Carabonica hybrid. Mr. David Thomatis, the originator of this cotton, has arrived in Mexico to continue these experiments on the West coast.

Uses of Prickly Pear —(By Dr. Chas. S. Dolley).

The controversy that recently has arisen in regard to the relative value of this plant for manufacture of alcohol, for fibre, and as a forage plant has led to this special investigation, which is now under way.

FORESTRY WORK.

Very extensive examinations of Mexican forests and of marketable timbers have been made in various parts of the country. Of special work undertaken may be mentioned:

Causes of Destruction of Agricultural Land in Mexico. —(By Mr. Runar I. Olsson-Seffer).

This important question has been investigated, and the work is being continued. A preliminary paper on the subject has just been published.

The Geographical Distribution of the Mexican Conifers in Connection with their Systematic Relationship.—(By Dr. Pehr Olsson-Seffer).

During the writer's studies of Mexican forests this subject became of importance and the study is being continued.

BIOLOGY.

At the present time no special work is under contemplation, but Dr. Dolley is considering an extended plan of research on biological subjects.

PUBLICATIONS.

The American Review of Tropical Agriculture, which was begun at the beginning of the year, is the organ of the Station. It is being edited by Dr. Pehr Olsson-Seffer, who has the fortune of counting among the Associate Editors the following gentlemen: Professor C. F Baker, of Pomona College, California, formerly of Museu Goeldi in Para, Brazil, and of The Central Agronomical Station in Cuba; Dr. E. B. Copeland, the Dean of the Agricultural College of the University of the Philippines; Professor Chas. S. Dolley, of the Tezonapa Botanical Station; Mr. T. F. Koschny, the rubber planter of Costa Rica; Professor Francis E. Lloyd, of Alabama Polytechnic Institute, formerly of the Carnegie Desert Laboratory, and of the Continental Rubber Company's Investigation Department; Dr. R. M. Olsson-Seffer, Veterinary Surgeon of Palo Alto, California; Dr. Rudolph Schlechter, Leader of a rubber expedition to New Guinea for the German Government; Professor F. A. Went, of Utrecht University, formerly of the Colonial Service of the Dutch Government, and Professor F. E. de Wildeman, of the Royal Botanic Gardens of Brussels, and a well known authority on Colonial agriculture. Mr. J. B. Carruthers, the Assistant Director of Agriculture of Trinidad, formerly Director of Agriculture of the Federated Malay States, was another of the Associate Editors until his death in June of this year.

Besides the Review, the Station will publish another series to be called "Notes from Tezonapa Botanical Station", each volume to consist of 320 pages, to appear from time to time at irregular intervals.

THE ACTIVITY OF THE STAFF.

Mr. Frederick Kaye, who came to Mexico under a long term contract, in April of this year, spent some short time in the State of Veracruz to become acquainted with the tropical conditions of Mexico. From May to the middle of September he was occupied in the chemical laboratory with investigations of various rubber latices, but on account of the death of his child and the illness of his wife he resigned on October 3rd., and immediately returned to England.

Dr. Chas. S. Dolley has, since he joined the staf, been occupied with chemical investigations of new rubber and gutta latices, continuing the work of Mr. Kaye.

Mr. G. Wannag is at present engaged in the investigation of some Mexican waxplants, and in the production of charcoal.

Mr. Runar I. Olsson-Seffer has durng the last year undertaken a number of journeys of investigation and study of economic botany and tropical agriculture in various parts of Mexico, including the States of Michoacan, Jalisco, Oaxaca, Puebla, Hidalgo, Mexico and Veracruz. He also inspected a number of plantations and forests in Oaxaca and Veracruz.

Mr. Edward Thimgren inspected lands and forests in San Luis Potosi, Michoacan and Guanajuato.

Mr. Rolf Olsson-Seffer had charge of estates in Veracruz and Chiapas, inspected lands in Oaxaca, and investigated the distribution of rubber plants in the State of Veracruz and Mexico.

Mr. W E. Lloyd inspected forests and plantations in Tabasco, Chiapas, Campeche, Yucatan, Quintana Roo, Jalisco, Tepic, and Sinaloa, especially studying mahogany forests and rubber.

Mr. E. Valeur has been occupied in rubber investigations, principally in the State of Oaxaca.

Mr. C. O. Lillieskold has been studying the Mexican Poppy and has been on two inspecting tours to Chiapas. He is now occupied in anatomical studies of various rubber plants.

Mr. D. Thomatis is engaged in investigation of cotton growing opportunities in Oaxaca and Chiapas.

Mr. N. M. Suarez investigated the rubbers of Morelos and Guerrero.

Mr. O. Bolin, for a short time field assistant, investigated the rubbers of Guerrero.

STAFF.

Director and Botanist	Pehr Olsson-Seffer, Ph. D.
Biologist	Charles Sumner Dolley, M. D.
Chemist	Frederick Kaye, A. R. C. Sc.*
Industrial Chemist	George Wannag.
Agriculturist	Rolf Gustaf Olsson-Seffer, B. Agr.
Agriculturist	Edward Thimgren.
Forester	William Edward Lloyd.
Assistant Botanist	Runar Ivar Olsson-Seffer.
Assistant to Director	Carl Olof Lillieskold, B. A.
Field Assistant	Einar Jensen-Valeur.
Cotton Expert	David Thomatis.
Engineer	Nicholas M. Suarez.
Librarian	
Stenographer	Theresa Montague.
Typewriter	Julio Espinoza.

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* Resigned, October 3, 1910.

On the following pages are given some personal information regarding the various member of the staff, their scientific work, general activity and published works.

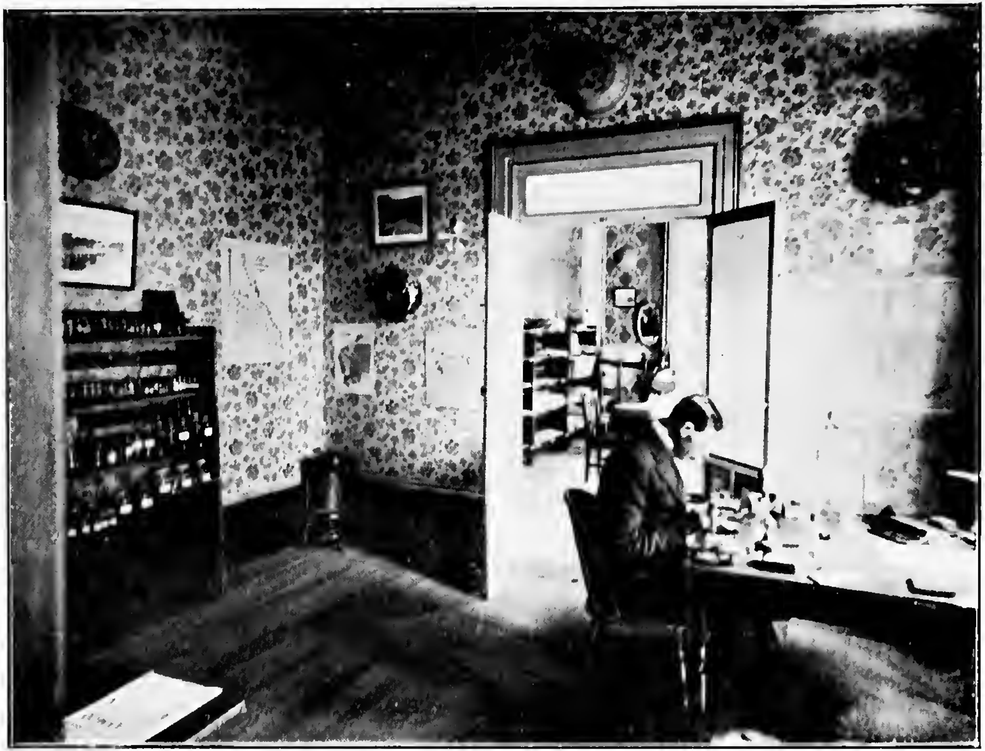

FIG. 4. MORPHOLOGICAL LABORATORY.

Biographical Notes.

DIRECTOR & BOTANIST.

Pehr Hjalmar Olsson-Seffer.

Born September 14, 1873, in Ekenas, Finland. Educated in Public Schools in Finland, especially at the Swedish Classical Lyceum in Abo, 1883-92. During summer vacations 1889 and 1890 received private instruction in Botany, especially phytogeography, by Dr. G. I. Rothstrom; Attended the extensive experiments in Electro-culture, conducted by the inventor, Prof. S. Lemstrom, in Finland; While at college had 11 scholarships; Appointed leader of a botanical summer excursion to the islands in Southwestern Finland, 1891; Awarded first prize for an essay on The Distribution of Plants in the Neighborhood of Abo; Passed entrance examination to the graduate school of Helsingfors University, June 2, 1892; Graduate student, 1892-95 and 1898-99 at the Imperial Alexander's University of Helsingfors.

Record of post-graduate studies, scientific and practical work.

1891.

Excursions for botanical and ornithological purposes, in Korpo archipelago (Finland), in Aland and in Nyland.

1892.

Excursions in West-Nyland and in Aland with a student assistant, in Nagu archipelago, and in the neighborhood of Helsingfors (Finland).

During fall semester attended courses in General Botany, Inorganic Chemistry, Zoology, comprising Morphology, Development and Phylogenetic Relations, and laboratory work in Comparative Plant Morphology and Cryptogamie Botany, Comparative Anatomy, German and Latin Composition, and several courses in Medicine.

Attended the monthly meetings of Societas pro Fauna et Flora Fennica during 1892-95 and 1898-99, and also the meetings of the Botanical Club of the University, where contributed frequently on botanical and ornithological topics, which contributions were published in the proceedings and annual reports of the former society for said years. Made an extended journey in Finland visiting many agricultural and forest estates for the purpose of studying methods employed.

1893.

Courses in General Botany, Vegetable Physiology, Morphology of Plants, Systematic Botany, Plantgeography, Phytopaleontology and methods of research, Zoology, Comparative Anatomy, and laboratory work on Vertebrates and Invertebrates, Ichthyology, Entomology and Classification of Insects, Physical Geography of Europe, and Practical work in Geography, Chemistry and laboratory work, Geology, Latin, German and French.

During fall semester also courses in Entomology, comprising Morphology, Habits and Distribution of Insects, and Classification, especially of Coleoptera, Climatology, and Paleontology, laboratory work, Map Projection, Sketching, Use of instruments, etc., Methods of Surveying and Leveling, Field Practice, and various courses in Medicine and Surgery, with laboratory and clinical practice; Passed public examination in the German language.

Received a fellowship for study of the flora of Kimito Island (Finland); Spent 10 weeks there and some weeks in Abo archipelago; The result was a botanical survey of the island, published in 1895 (See Bibliography). A paper (in Swedish): "Phenological notes made in Kimito 1893," was deposited in the botanical library of the Finnish Museum.

Read several papers on ornithological subjects before scientific societies and presented to Societas pro Fauna et Flora Fennica a manuscript: "Notes on the migrations of birds"; Contributed to Professor Reuter's investigations on "Herrings in fresh water lakes;" Made observations on the influence of night frosts on vegetation during this and following year for the Finnish Society of Science (Published by Dr. A. O. Kihlman in Fennia 1894 and 1895); In charge of the herbarium of the Geographical Society of Finland from October 10, 1893 to December, 1895; Secretary of an Academic society for promotion of agricultural education, in which capacity travelled and lectured throughout Finland.

1894.

Post graduate courses in Economic Botany, History of Botany, Ecology, Forest Botany, Principles of Development and Phylogeny of Plants, Cryptogamic Botany, Zoology, Anatomy, and Histology, writing of Zoological Essays, Geography, Mapping, plain and topographical surveys in the field, Methods of observing and making reductions in Triangulation; also courses in Medicine, Russian and French.

Received a fellowship for a floristical survey of Nagu archipelago, special attention to be paid to the vegetation of the beach; Spent 9 weeks there accompanied by a student assistant; "Phenological notes, made in Nagu" were deposited in the botanical library of the Finnish Museum; Several scientific papers were read at various meetings; A list of plants, found in Nagu and Korpo archipelagoes, was compiled for publication in joint authorship with A. W. Granit, M. A., Forest Engineer; Contributed to Professor Elfving's survey of cultivated plants in Finland; Collected Coleoptera in Southpen Finland for the Finnish Museum; Wrote frequently in the public press; Lectured on agricultural and scientific subjects.

1895.

By special permission admitted as graduate student with Master's degree to the Swedish Normal Lyceum, Helsingfors, January, 1895; Attended courses in Natural Sciences and Geography, during 1895, giving the usual number of proof lessons; As assistant in Natural Sciences conducted all the excursions with the students, and was often in charge of the botanical classes.

Received a fellowship for studies of the beachflora and vegetation in the Eastern archipelago of Aland; Traveled there ten weeks, accompanied by two student assistants, and also in Stockholm archipelago (Sweden), and in Nyland (Finland); Presented for publication in Acta Soc. F. Fl. F. two papers: "Contribution to the question of the phytogeographical boundary between Abo and Aland provinces", and "Ornithological observations in the Southern Archipelago of Abo: A contribution to the Avifauna of S. W. Finland", but both manuscripts were destroyed by fire.

Editor-in-chief of semi-weekly paper "Aland" to December 1897; Secretary of the Agricultural Society of Aland, from December 1895 to December 1897; Director of several public companies.

1896.

Studied the beachflora in Southern Aland (Finland); Accompanied by two student assistants made a nine weeks excursion in the Baltic Provinces of Russia between Reval and Riga, and on the islands of Wormso, Dago, and Oesel, especially for ecological studies; Museum and library studies at the University of Dorpat, Russia, under Prof. Dr. Edmund Russow, and in St. Petersburg under the guidance of Dr. J. Klinge; Plant collecting for Herbarium Musei Fennici and the Botanical Gardens, St. Petersburg; Collected later in Nyland and Aland for the Finnish Herbarium; Instructor in Swedish and History and temporary teacher of Natural Science, at the College of Mariehamn; As Secretary of the Agricultural Society of Aland lectured frequently on Economic Botany; Managing Director of a printing establishment in Mariehamn (Finland), 1896-97; Director of several companies and societies.

1897.

Received fellowship for hydrographical investigations in the Finnish archipelago, and spent eight weeks there with a student assistant, at the same time studying the beach vegetation; Excursions in Aland with Professor Sernander of Upsala, and with Dr. K. E. Hirn, and also on the Swedish East Coast, with two assistants; Made a monographical study of the relations between present plant covering of the shores of Lake Langtrask and the fossil remains in the neighboring peat bogs (See Bibliography); Lecturer in Natural Science, Public High School, Aland; Director of several companies; Secretary of several Educational societies.

Studied Plant Distribution, Ecology and Paleobotany, Fall semester, 1897, at the Royal University of Upsala in Sweden; Also laboratory work, carpological studies and excursions; Received advice on Methods of Research; Instruction in Quaternary Geology by Prof. A. G. Hogbom; Attended the monthly meetings of the Botanical, Geological and Zoological sections of the Natural Science Association of Upsala, of the Geographical Society of Upsala, and of the Botanical Society of Stockholm; Elected Secretary of the Geographical Society of Finland to September 1899; In charge of the Herbarium of the Society, November 1897 to August 1898; Organized 12 public libraries in various parts of Aland during the year; Commissioned by the Swedish Society for the Advancement of Aland to give a series of educational lectures throughout the country; Member of the Board of Directors and Secretary for the Public High School of Aland, from 1896–98; Excursions to the West Coast of the Gulf of Bothnia.

1898.

Re-admitted to University of Helsingfors; Studied Botany, Geography and Zoology for the degree of Doctor of Philosophy, and passed prescribed examination in Geography as major subject for that degree; Private Assistant in Biological Geography, 1898, to Dr. R. Hult, at the Geographical Institution of the University; Studied Plant Geography and Forest Botany at the Imperial University of Jurjew, Russia, 1898. Extensive botanical excursions in Western Russia; Studied Botany and Materia Medica at the University of Konigsberg, in Germany, during part of 1898; Excursions on the northern coast of Gulf of Finland with a student assistant, in eastern Finland, on the Finnish Coast of Gulf of Bothnia, studying the beachflora and vegetation; Visited for the same purpose the islands of Mohn and Oesel, and the coasts of the Gulf of Riga in the Baltic provinces of Russia in the autumn; Studied Phytogeography at Reshiza for Dr. E. Lehmann, and Phytogeography and Forest Botany at the Universities of Konigsberg and Dorpat, and Telmatology under the guidance of Dr. J. Klinge in St. Petersburg; Read papers before Societas F. Fl. F. and contributed to O. Bomansson's work "Mosses from Aland"; Visited different parts of Russia, Siberia and Northern Sweden for forest investigations.

Established a semi-weekly popular newspaper, "Vart Land", and acted as editor-in-chief from November 20, 1897 to June, 1899; General Manager of a printing establishment and publishing house in Helsingfors (Finland); Organized a Congress of Fisheries in Helsingfors, which led to several changes in the Fisheries legislation of the country; Investigated Methods of dry distillation of wood.

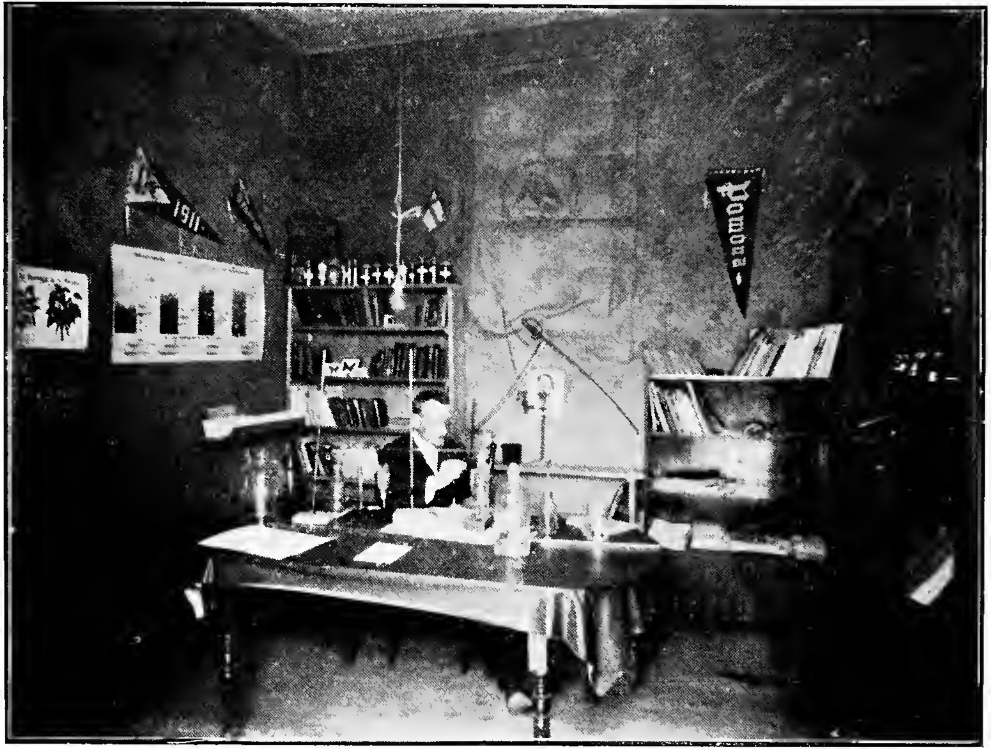

FIG. 5. PLANT PHYSIOLOGICAL LABORATORY.

1899.

Instructor in Botany, College for Boys and Girls, Helsingfors; Visited the International Horticultural Exhibition in St. Petersburg; Studied Forestry in Stockholm and in Russia; Received a fellowship for researches on the beachflora and vegetation of the Baltic Sea; Excursions during the summer along the whole East and South Coasts of Sweden, on Gotland, Oeland, and Bornholm islands, on Sjaelland in Denmark and on the Baltic Coast of Germany; In the autumn, excursions along the north coast of the Gulf of Finland; Later ecological studies in Denmark, at Kiel in Germany, in Holland, and on the eastern Coast of England; Visited various European countries for studies of agricultural organization and forestry; Museum and library studies in London and Birmington (England); Elected Delegate to the International Geographical Congress in Berlin.

1900.

Botanical excursions on the North coast of France and in the neighborhood of Bordeaux; Library and Museum studies in Oxford, in British Museum, and in Kew Gardens, London, during March and April; Ecological studies in Jylland, Fyen, and Sjaelland (Denmark) and on the Swedish south and west coasts; Studies in London during August; Botanical excursions on the Devonshire coast in England, and in the neighborhood of Lisbon, Portugal, on the Spanish south coast, at Marseille, France, and in Southern Italy; Later in Egypt, Ceylon and in Western Australia, especially studying the beachflora.

Traveled in several European countries and in India, investigating Agriculture and Forestry; Studied experimental methods at a great number of agricultural stations and other similar institutions; Special Agent of the Queensland government for promoting immigration to that country.

1901.

Led a geographical and scientific expedition to the interior of Australia, six months; Chemist to Maryborough Sugar Factory, and field manager on a sugar plantation; Advisory and inspection work for the Government of Queensland in regard to colonization and land setlement; Inspected numerous agricultural estates in Tropical Australia; Investigated some of the forest problems of that country.

1902.

Studied the forests and sandflora in New South Wales, Victoria and South Australia; Advisory work in the Land Department of the Government of West Australia; Inspected numerous agricultural estates for the Government and private owners; Investigated the Eucalyptus and Acacia forests of Australia; Botanical expedition in South Sea Islands, including New Guinea, New Hebrides, Solomon and Santa Cruz Islands; Traveled in New Zealand, investigating agriculture, dairying and forestry; Studied the flora and vegetation of Samoa; Investigated the sugar industry of Hawaii; Experiments on the Influence of Electricity on plant growth.

1903.

Amanuensis in the library of the Leland Stanford Jr. University, California; Graduate student in Botany at this university from January, 1903, to August, 1904; Studies of the dune vegetation on the coast of California; Assistant in the Systematic Botany and Forestry Department at Stanford University; Studied Botany and Forestry at the Hopkins Seaside Laboratory, in California, during the summer; Investigated Eucalyptus culture in California; Studies and Experiments on nitrification of soils.

Elected member of the scientific honor society "Sigma Xi" of the American Universities, of the Science Association of Stanford University, and of the Geological Society of American Universities.

1904.

Instructor in the Department of Systematic Botany and Forestry of Stanford University to August, 1905.

Numerous botanical excursions in California; Studied the forest flora of the Santa Cruz mountains in Central California; Passed examinations for the degree of Doctor of Philosophy in Botany, and received the degree on September 9, having submitted a thesis "Comparative Study of Sandfloras on Marine Coasts"; Conducted a series of experiments on the influence of light on plants, and made special studies of the Chaparral formation in California; Technical Expert in suits regarding destruction of vegetation by sulphur fumes.

Attended many meetings of the Biological Society of Western America; Professor of Biology at San Francisco Veterinary College until October, 1905; Lectured in San Francisco on various subjects.

During previous and following years attended lectures and courses on International Law, Roman Law, Legal Encyclopaedia, Modern Political Representation. Mercantile and Marine Law, and Political Economy, in Paris, France, Birmingham and London, England, Sydney and Perth, Australia, Berkeley, California, and Washington, D. C.

1905.

Studies of the forest flora of California; Appointed Botanist of the Bureau of Science in the Philippines, but declined; Commissioned by La Zacualpa Rubber Plantation Company to investigate conditions of rubber and coffee culture in Mexico; Spent nine weeks in Chiapas, Oaxaca and Vera Cruz; Investigations of the desert flora in Northern Mexico and Arizona; Examined the conditions of the Guayule rubber industry at the request of the American Consul General in Mexico (See Reports of U. S. Department of Commerce and Labor); Studied forest conditions in Southern California; Laboratory studies of rubber at Stanford University; Commissioned to organize Lu Zacualpa Botanical Station and Rubber Laboratory in Chiapas, Mexico, and appointed Director of this Institution from November 1, 1905, for three years;

Traveled in Guatemala during December, investigating tropical industries; Studies of Influence of tropical light on white man; Investigation of Mexican Forage Plants.

1906.

Detailed botanical and chemical rubber investigations and experiments at La Zacualpa Botanical Station until July 30, 1906; Visited and reported upon a number of tropical plantations in Mexico, in August; Visited the Missouri Botanical Garden at St. Louis, the Department of Agriculture in Washington, the New York Botanical Garden and the University of Chicago; Spent six weeks in the Hawaiian Islands for investigation of the prospects of rubber growing, commissioned by San Francisco capitalists; Investigated agricultural conditions in Japan; Investigated silk and rice culture, and other agricultural industries in north and south China; Commissioned by the President of Mexico to study conditions of Agriculture and Agricultural Organization in various countries during a journey round the world; Discovered rubber in various Mexican species of *Plumeria;* Studied the Palo Amarillo (*Euphorbia fulva*) rubber tree and the cultivation of *Hevea* and *Manihot* rubbers in Mexico; Investigated various diseases of corn and rice in Mexico, and the Forage conditions in the South of the Republic.

1907

Spent six weeks for studies in Economic Botany at the Botanical Garden in Singapore; Traveled in Java and Sumatra, investigating tropical agriculture, especially rubber and guttapercha, and studied the forestflora and forest organization at the Botanic Gardens at Buitenzorg and Tjibodas; Visited a great number of plantations in Strait Settlements, Johore and Federated Malay States; Studied agricultural organization at the Department of Agriculture in Kuala Lumpur; Traveled throughout Ceylon, visiting a number of plantations; Studied Economic Botany at the Royal Botanic Gardens of Peradeniya; Investigated Agriculture and Irrigation in Egypt, Viticulture and Reforestation work in various parts of France; Studied tropical Economic Botany at the Colonial Museum in Marseilles and in Paris; Visited a number of agricultural experiment stations and forest nurseries in France, Belgium and Holland; Investigated Museum Organization and Laboratory Methods at the Koloniaal Museum in Haarlem in Holland, and at the Imperial Institute in London; Examined the market conditions for tropical products in Marseilles, Antwerp, Amsterdam, London and Liverpool; Studied Economic Botany at Kew Gardens and British Museum during four weeks, and visited the Arnold Arboretum and the Gray Herbarium of Harvard University; Visited the Carnegie Desert Laboratory in Tucson, Arizona, and a number of experiment stations and agricultural colleges in the United States and Canada; Examined forest conditions in Oregon and parts of Northern California; Renewed studies of the

Chaparral formation in Southern California;Inspected a number of tropical plantations in Southern Mexico, and various haciendas on the Mexican highlands: Devised improved methods of tapping rubber trees and for coagulating *Castilla* rubber (British Patents).

Technical Adviser on agriculture and forestry to numerous plantation campanies in Mexico; Organizer and President of the Mexican Agricultural Inspection and Consultation Bureau; In charge of the reforestation work on various haciendas in Mexico; Editor of department of tropical agriculture in the Mexican Investor from April, 1906 to December, 1907; Editor for MacMillan & Company Ltd., of London, of ''Practical Handbooks on Tropical Agriculture''; Organizer and Vice-President of the Rubber Planter's Association of Mexico; Investigated Mexican Tanbarks for European capitalists; Reported on Rubber and Coffee Production of Mexico for American capitalists; Director of various companies; Experiments on Influence of Electricity on Plants; Continued study of Forage plants and Forestry conditions of Mexico.

1908.

General Manager of several plantation companies in Mexico; Repeated journeys in Southern Mexico, during the first half year, investigating rubber culture and tropical agriculture generally; Studies of forest conditions in Southern California during the summer, and of Mexican forests in the autumn; Travels in the United States and in many parts of Mexico, especially in the Tropics, reporting on many estates; Organizer and Director of Tezonapa Botanical Station since December 1908; Investigations of the fibre industry of Mexico for New York capitalists; Laboratory investigations of Tanning materials, Rubbers, Resins and Vegetable Waxes; Practical Field Experiments on Cotton growing, Eucalyptus culture and Ramie cultivation in Mexico; Studies of Medicinal plants of Mexico and Guatemala; Chemical and physical studies of soils from Java, Malaya, Ceylon, Hawaii, Cuba and Mexico; Investigated humus formation in tropical Mexico; Discovered a rubber producing *Jatropha* in Mexico and studied the rubber from Chilte; President, Tropical Agriculture Publishing Co.; Reported on the Sugar Industry of Mexico for American capitalists; Experiments on the effect of phosphates and nitrates on various tropical crops; Reported on the cultivation of cork oak in Mexico for New York capitalists.

1909.

Traveled in different parts of Mexico and in the United States, visiting various universities and experiment stations, crossed Canada from west to east, and traveled in England and France; Studied Economic Botany in London, at Kew Gardens and elsewhere; Returned from Europe to New York in December; Commissioned by the Minister of Fomento in Mexico to prepare various publications descriptive of the country and its resources; Studies of Mexican Useful Plants;

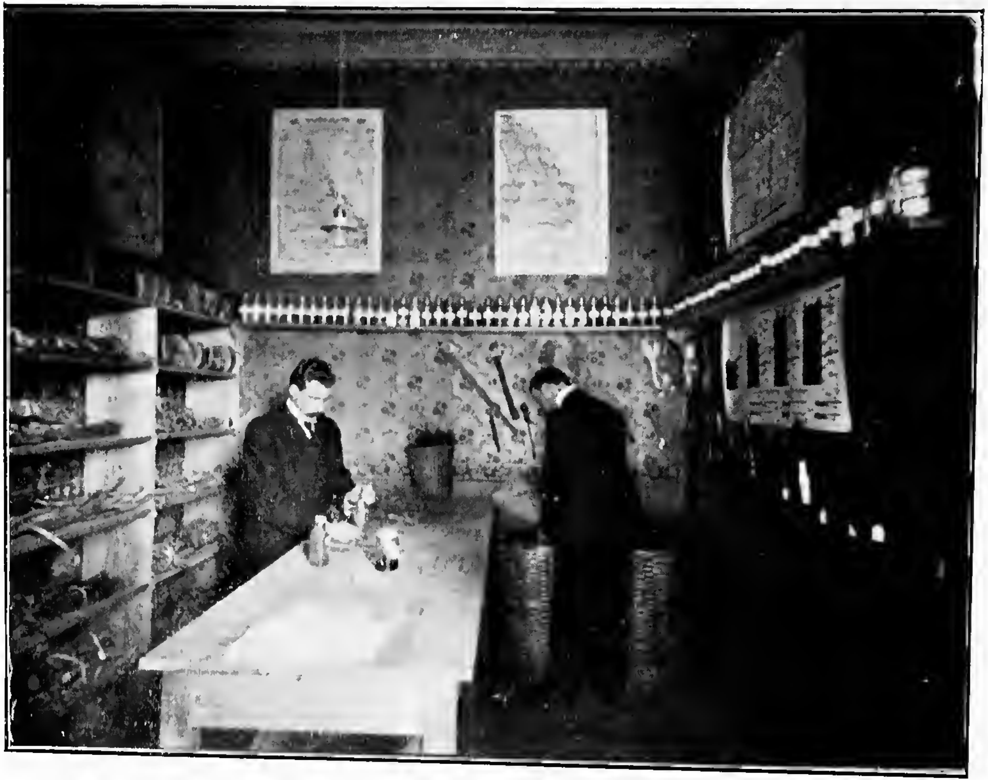

FIG. 6. SAMPLE ROOM AND MUSEUM.

Reported on Cotton culture in Mexico for St. Louis capitalists; Director and General Manager of several plantation companies; President; Pan-Mexican Realty and Securities Co.; Discovered six new rubber and gutta producing plants in Mexico; Reported on the oil and rubber producing plants of Mexico for British capitalists and on the possibilities of cultivation of Spanish Cedar for American capitalists; Reported on Colonization to the Minister of Fomento in Mexico; Studies of Cacao fermentation problems and of Diseases of Citrus fruits in Mexico;Many reports on Mexican forests, estates and plantations for foreign capitalists; Study of phytogeographical problems in tropical Mexico.

1910.

Inspected, in January, lands in Northern Mexico for British capitalists; Traveled through the United States to Europe, where spent three months in England; Also visited France and Belgium and again traveled through the United States from New York to California; Inspected and reported upon lands and estates in various parts of Mexico, for several groups of British, French and American capitalists; Discovered two new rubber producing plants in Mexico; Devised improved methods of coagulating Castilla rubber and methods and apparatus for coagulating rubber by smoke (Mexican Patents); Also improved tools for tapping rubber (Mexican Patent); Installed factories for manufacture of crude rubber in Mexico; General Manager and Director, Standard Rubber Corporation of Mexico, Ltd. and of Amistad Rubber Plantations and Estates, Ltd.; General Manager, Soconusco Rubber Plantations, Ltd.; Vice-President, Compañía Mexicana Manufacturera de Artefactos de Hule, S. A.; President, Compañía Mexicana Exploradora de Hule Nativo, S. A.; President, Contract, Trading and Finance Co.; Organizer and Editor of "American Review of Tropical Agriculture"; Acting Consul for Portugal in Mexico; Reported on the Cultivation of Spanish Cedar in Mexico for St. Louis capitalists; on the Sugar industry for London capitalists; on Rubber in Mexico for capitalists in Washington, D. C. and on Conditions for Eucalyptus culture in California for the Forestry Society of California; investigations of Mahogany supplies in Mexico and of Tanning Materials.

Corresponding Member, Sociedad Mexicana de Geografía y Estadística; Fellow, American Association for Advancement of Science; Association Scientifique Internationale d'Agronomie Coloniale; Société d'Agriculture Tropicale; Royal Society of Arts; Royal Meteorological Society; Royal Horticultural Society; Societas pro Fauna et Flora Fennica; Finland Geographical Society; Académie Internationale de Géographie Botanique; Member, American Folk-lore Society; American Academy of Political and Social Science; National Geographic Society; American Forestry Association; Swedish Society for

Anthropology and Geography; Geological Society of Stockholm; Association Internationale des Botanistes; Indigenous Rubber Association, London; Association des Planteurs de Caoutchouc, Anvers.

PUBLICATIONS.

1894.

1. Nagra anmarkningsvarda fogelfynd i Kimito.—Meddelanden, Societas pro Fauna et Flora Fennica v. 20 (1894) p. 11.

1895.

2. Aland. Illustrerad landskapsbeskrifning (Aland, description of country with maps and illustration).—(W. Hagelstam, Helsingfors.) 111 pages.

3. Bidrag till kannedomen om floran i Kimito skargard. (Contribution to the knowledge of the flora of Kimito archipelago).—Acta Soc. F. Fl. F. v. XI. No. 11, 50 pages.

4. Om forekomsten af Crambe maritima L. i Finnland.—Botaniska Notiser, Lund, 1895, p. 204-206. (On the distribution of Crambe in Finland).

5. Anmarkningsvarda mossor fran Nagu.—Medd. Soc. F. Fl. F., v. 21, p. 67. (Notable mosses from Nagu).

6. Tva nya mossor,—Medd. Soc. F. Fl. F. v. 21, p. 85. (Two new mosses).

7. Finska tradjattar, XXI.—Geografiska Foreningens Tidskrift, 1895. (Big trees in Finland).

8. Editor-in-chief of Aland, weekly Swedish newspaper published in Mariehamn, from December 10, 1895, to January 1, 1898.

1896.

9. Editor of Aland Agricultural Journal, from January, 1896 to January, 1898.—The paper was published monthly in Mariehamn, Finland.

10. Svenska vaxtnamn i sydvastra Finland.—Botaniska Notiser, Lund, 1896, pp. 1-10. (Swedish plant names in S. W. Finland).

11. Artikelserie om Alands folkhogskola.—Aland. Mariehamn, 1895. (Series of articles on university extension courses in Aland).

12. Folkmangdsforandringarna i Finland under decenniet 1880-1890. Kartografisk framstallning.—Geografiska Foreningens Tidskrift, 1896, pt. 1-3, pp. 1-15, Map, (Variations of the population in Finland during the decade 1880-1890).

13. Nya mossor fram Aland.—Medd. Soc. F. Fl. F., v. 22, p. 14. (New mosses from Aland).

14. Tva nykomlingar *Recurvirostra avocetta* et *Saxicola rubicola* Bechst.) till finska fogelfaunan.—Medd. Soc. F. Fl. F. v. 22. p. 77-78. (Two additions to the Finnish avifauna).

15. Sallsynta foglar funna i sydvastra skargarden.—Medd. Soc. F. Fl. F, v. 22, p. 79-80. (Rare birds collected in the Southwestern archipelago).

16. Vid juletid pa Alands skar. Tidningen Alands julalbum, 1896.—Mariehanm, 1896. (Yule time on Aland's islets).

1897.

17. Stunden barn. Historietter och visor af Harald Viking. 109 pp.—Mariehamm, 1897. (Stories and poems).

18. Chief editor of semi-weekly Swedish newspaper Vart Land, published in Helsingfors, Finland, from November 20, 1897, to June 20, 1898.

1898.

19. Vara sadesslag.—Ofvertryck No. 14 fran Vart Land. 20 pages.—Helsingfors, 1898. (Our cereals).

20. Ordbok for menige man.—Vart Lands Bibliotek II. 226 pp. Helsingfors, 1898. (Dictionary of popular terms).

21. A. E. Nordenskiold. Biografiskt utkast.—Ofvertryck No. 15 fran Vart Land. 23 pages.—Helsingfors, 1898. (Biographical sketch).

22. Liten Visbok, innehallande de vanligaste sanger och visor, utgifven af Aron Blomstrom. 165 pages.—Helsingfors, 1898. (Song collection).

23. Om insamling af medicinalvaxter i Finland.—Yearbook of the Swedish Society for public instruction, 1898. 16 pages. (Collecting of medicinal plants in Finland).

24. Sommarskolor i staderna.—Ofvertryck No. 26 fran Vart Land. 12 pages.—Helsingfors, 1898. (Summerschools in the cities).

25. Editor of Midvinter 1898. En halsning till ung och gammal i Finlands Svenska hem. 58 p.—Helsingfors, 1898. (Midwinter 1898, a publication of political and literary content).

1899.

26. Storfurstendomet Finlands konstitution eller statsforfattning.—Vart Lands Bibliotek IV. 146 pages.—Helsingfors, 1899. (The constitutional laws of the Grand-duchy of Finland).

27. Medlemsforteckning af Geografiska Foreningen i Finland.—Geografiska Foreningens Tidskrift, 1899, 12 pages.

28. Nagra iakttagelser ofver hafsvattnets salthalt i Finska skargardshafvet.—Geog. For. Tids. 1899, No. 5, p. 257-280. (Some observations on the salinity of sea-water in the Finnish archipelago).

29. The Enare Lumber Co. prospectus.—30 pages.–Helsingfors, 1899. (Description of Government forests in Lappland).

30. En Trapa-forande torfmosse pa Aland.—Geog. for. tids. 1900, pt. 1-2, p. 19-64. Map.—Also in Scientific Proceedings of Geog. Soc. of Finland, vol. V. 45 p. (Peat-bog with Trapa on Aland).

1900.

31. Hvart bor emigrationen ledas?—London, 1900.—Reprinted in many Swedish papers in March, 1900. (Discussion of the emigration question).

32. Majerihandteringen i Queensland. 7 pages.—London, 1900. (Dairy industry in Queensland).

33. Queensland, dess natur, folk och kultur, i korthet skildrade. 60 p. Ill.—Helsingborg, Sweden, 1900. Published by the Queensland Government. (Queensland, its nature, people and culture).

34. Majerihandteringen i Queensland. 2nd Edition, 6 p.—Helsingborg, 1900. Published by the Queensland Government. (Dairy industry in Queensland).

1902.

35. Queensland, framtidslandet i Australien.—3 editions. 168 pages. Map. Brisbane, 1902. (Written at the request of the Premier, Hon. R. Philp, for the Queensland Government). (Queensland, the land of future in Australia).

36. On the possibility of preventing damages by frost.—Proc. Royal Soc. of Queensland, v. 17, pp. 101-122.

37. Vestaustralien. Handbok.—3 editions. 151 pages, Ill.—Perth, 1902. (Western Australia, Handbook, compiled at the request of the Hon. Adam Jameson, Minister of Lands, Western Australia).

1903.

38. Australiens upptackande.—Norden (Danish periodical in Melbourne, Australia) No. 177-178. March, 1903. (The discovery of Australia).

39. Proposed scientific expedition to Northern Australia.—20 pages. Stanford University, 1903.

40. Interiorer fran utlandet.—Reviews of foreign politics in Vestkusten (Swedish weekly in San Francisco) from March 1903 to the end of the year.

41. Examination of organic remains in post-glacial deposits.—American Naturalist, v. XXXVIII, No. 443, p. 785-797.—Also Reprinted.

1904.

42. The place of Linneaus in the history of Botany.—Journal of Botany, September, 1904, 8 p.—Also Reprinted.

43. En Dansk Opgave.—Den Danske Pioneer, December 15, 1904.

44. Department of Biology.—San Francisco Veterinary College Quarterly Bulletin, v. 1, No. 2. p. 20-21.

1905.

45. A biological station in Greenland.—Science, N. S. v. XXI, No. 527, p. 189-191, Febr. 3, 1905.—Also Reprinted.

46. The principles of phytogeographic nomenclature.—Botanical Gazette, 39: 179-193, March, 1905.—Read before section G. of A. A. A. S., Philadelphia, December 30, 1904.

47. A visit to Luther Burbank, by Prof. Hugo de Vries, translated from the Dutch language by Pehr Olsson-Seffer.—Popular Science Monthly, 1905, p. 329-347.—Also Reprinted.

48. Ett tjugonde seklets universitet.—Ord och Bild, Stockholm, v. 14, pt. 6, pp. 321-335.—Also Reprinted. (A twentieth century university).

49. Review of Skottsberg: On the zonal distribution of South Atlantic and Antartic Vegetation.—Bot. Gaz. vol. 39: pp. 307-308. April 1905.

50. Proposal for the establishment of rubber experiment stations and laboratory in Mexico.—San Francisco, 1905.

51. Report on Hidalgo Plantations and impressions of La Zacualpa Rubber Plantation. 19 pages.—San Francisco, 1905.

52. Rubber Planters ought to have Experiment Station.—India Rubber Review, vol. V, pp. 314-315. September, 1905.

53. Reviews in Botanical Gazette, vol. XL.

1906.

54. The truth about rubber culture.—Mexican Investor, March 3, 1906, pp. 6-8.—Also Reprinted.—Reprinted in the Citograph, vol. 38, No. 9, pp. 1-3.

55. Editor of the Department of Tropical Agriculture of the Mexican Investor, a weekly journal published in Mexico City, from March 26th., 1906, to December, 1907.

56. What rubber trees can be planted in Hawaii?—Hawaiian Forester and Agriculturist, vol. III, pp. 333-340. November 1906.

57. Cultivation of Rice.—Bulletin No. 1, La Zacualpa Botanical Station and Rubber Laboratory. 13 pp. May, 1906.—Reprinted from Mexican Investor, May 5 and 12, 1906.

1907.

58. Rubber planting in Mexico and Central America.—Agricultural Bulletin of the Straits and Federated Malay States, vol. VI, pp. 31 Jan. 1907.—Reprinted in Mexican Investor, March 9, 1907, pp. 15-20, March 16, pp. 15-20, March 23 pp. 15-20 March 30, pp. 15-20, May, pp. 22-23.—Also Reprinted in Tropical Life, April, 1907, pp. 50-52, May, pp. 66-68, June, pp. 82–84, July pp. 98–100, August, pp. 114–116, September, pp. 130–131.

59. Visits to some botanic gardens abroad.—Plant World, vol. X; 27–30, 59–63, 84–90, 117–118, 161–167, 169–172, 193–200, February to September, 1907.—Also Reprinted.

60. Rubber Planting in Mexico.—Ceylon Observer, February 1, 1907.

61. To the rubber planters in Mexico.—Circular, August, 1907. 4 pp.—Reprinted in numerous periodicals.—Spanish translation in El Heraldo Agricola, September, 1907.

62. Management of tropical plantations and forest lands in Mexico. 7 pp.—Mexico City, October, 1907.

63. Deterioration of Sugar Cane.—Mexican Investor, vol. IX, No. 5, p. 23. September 1907.—Also Reprinted in Louisiana Planter.

64. Cultivation of Medicinal Plants in the Tropics.—Mexican Investor, vol. IX, No. 5, p. 23, 1907.

65. The Present Condition of Rubber Culture.—Yearbook of the Rubber Planters' Association of Mexico, 1907–08, pp. 10–20.—Reprinted in

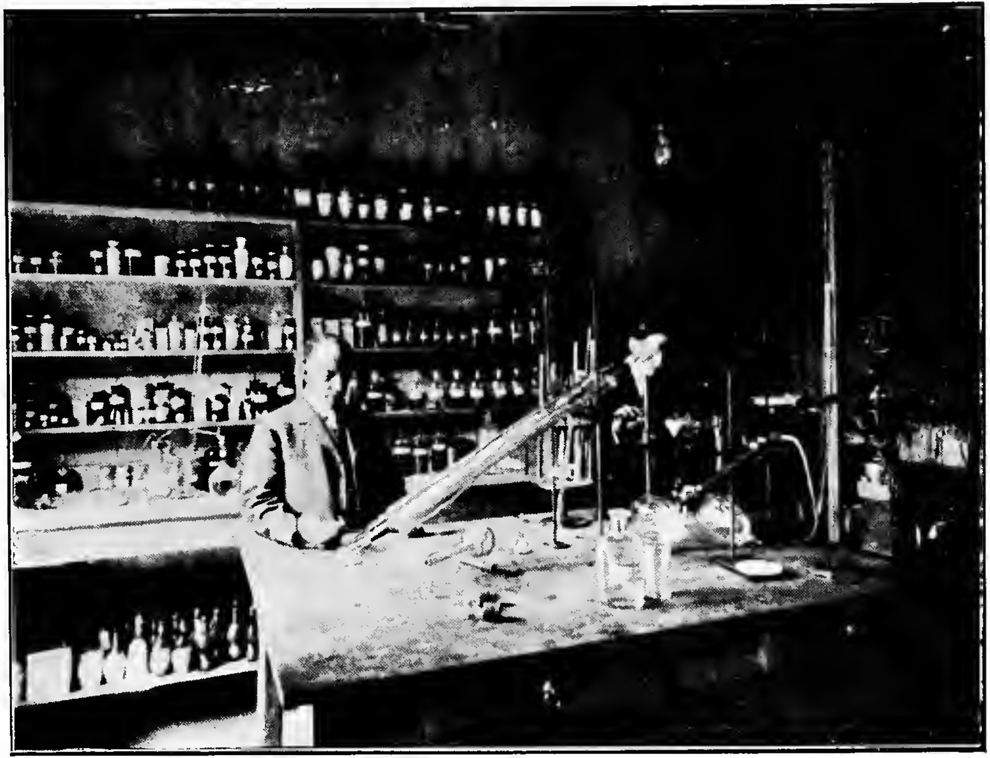

FIG. 7. CHEMICAL LABORATORY.

Mexican Investor, vol. IX, No. 7, pp. 18–24, November 1907.—Also in separate reprint, 10 pp.—Bulletin American Bureau of International Republics, vol. 26, pp. 27–42, 1908.

66. Preparation of Crude Rubber.—Yearbook of the Rubber Planters' Association of Mexico, 1907-08, pp. 32–39, 1907.—Also Reprinted, pp. 11–18, 1908.—Reprinted in Mexican Investor, vol. IX, No. 9, pp. 27–30.

1908.

67. Yearbook of the Rubber Planters' Association of Mexico, 1907-08. 45 pp.—Mexico, D. F. 1908. (Editor).

68. The Nobel Prices.—Science, N. S., Vol. XXVII., No. 681, pp. 108–112, January 17, 1908.—Also in reprint, 11 pp.

69. Bureau Mexicano de Inspecciones y Consultas Agricolas. 8 pp.—Mexico, D. F., 1908.

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81. Notes on Present Condition of the Castilla Rubber Industry.—Lecture read before the Conference held in connection with the International Rubber and Allied Trades Exhibition, London, September 1, 1908.—Lectures on India Rubber, Edited by D. Spence, pp. 86–98, May 1909.—Also Reprinted in Tropical Life, vol. V.

82. Caravonica Cotton in Mexico.—Report prepared for W. A. Graham-Clark, Special Agent of the U. S. Department of Commerce and Labor, and published in extracts in Daily Consular and Trade Reports, June 4, 1909, No. 3498, pp. 1–3.

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[5]. Nuevos productos susceptibles de explotación en México. 22 ills.
[6]. Notas sobre el cultivo de las frutas. 22 ills.
[7]. Explotación industrial de los animales. 10 ills.
[8]. Irrigación y preparación de las tierras. 2 ills.
[9]. Importancia de la selvicultura. 9 ills.
[10]. Revista forestal de los principales países del mundo.
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109. Genesis and Development of Sand Formations on Marine Coasts. —Augustana Library Publications No. 7.

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111. Cultivo del caucho en México y Centro América. Con 8 láminas.

112. Investigations in coagulation of Rubber. (Contrib. Tez. Bot. Sta. No. 12).—Am. Rev. Trop. Agr., vol. I, pp.

113. *Plumeria*, A New Rubber Producing Plant of Mexico. (Contrib. Tez. Bot. Sta. No. 14).—Am. Rev. Trop. Agr., vol. I, pp.

114. Influence of Forests on Climate. (Contrib. Tez. Bot. Sta. No. 15).—Am. Rev. Trop. Agr., vol. I, pp.

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118. Ecological adaptations of sand vegetation on marine coasts.—Annals of Botany, vol. XXIV, 38 pp.

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121. Comparison of the principal rubber producing plants under cultivation.—Am. Rev. Trop. Agr., vol. I, pp.

122. (With Runar I. Olsson-Seffer) The Sugar Cane Industry and its Progress.—Am. Rev. Trop. Agr., vol. I, pp.

123. [With Rolf Olsson-Seffer] Measurements of Rubber Trees in Southern Mexico.—Am. Rev. Trop. Agr., vol. I, pp.

124. The Settler's Handbook on Mexico. With ills.—Mexico.

125. The cultivation of roselle [*Hibiscus sabdariffa*].—Am. Rev. Trop. Agr., vol. I, pp.

126. *Euphorbia*, planti nueva da gomma elastica.—Palermo.

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128. Mexico. Forr och Nu. Land och Folk. Handel och Naringar. Med Bilder och Karta.—Stockholm.

129. [With Helen Olsson-Seffer] Things seen in Mexico. With ills. [Seeley & Co., London].

BIOLOGIST.

Charles Sumner Dolley.

Born June 16, 1856, in Elyria, Lorraine County, Ohio, U. S. A. Educated at Rochester Collegiate Institute, Rochester, New York; Institute Boniface, rue de Conde, Paris, France; Geneseo Academy, Geneseo, Livingston County, New York; Fewsmith's Classical School, Philadelphia, Pa.; Syracuse University, Syracuse, New York. Class of 1878.

Record of post-graduate studies, scientific and practical work.

1873.

Special studies and field work as Assistant to Dr. Joseph Leidy, Zoologist and Paleontologist, and Dr. Thomas K. Porter, Botanist, with the U. S, Geological Survey, in the Uintah district, Wyoming Territory, with headquarters at Fort Bridger.

1874.

Entered Syracuse University; Scientific Courses, Collegiate Department; Special field work in Geology and Mineralogy with Alexander Winchell; Vacation Studies as Assistant to Dr. Joseph Leidy in Marine dredging at the U. S. Fish Commission Station at Noank, Connecticut, and in collecting plants and minerals in Minas Basin, Bay of Fundy, with headquarters at Parrsboro, N. S.

1875.

Collegiate studies continued; European trip with Dr. Joseph Leidy for field work in the Austrian Tyrol, and Salzkammergut; studied Austrian salt deposits, with headquarters at Berchtesgaden.

1876.

Collegiate studies continued; European trip, attending courses of lectures by Dr. Granger Stewart, University of Edinburgh, Scotland.

1877.

Collegiate studies continued; Field work on the Fauna and Flora of the Geneseo Valley, New York; Studies at the New York State Fish Hatcheries at Caledonia, N. Y.

1878.

Collegiate studies completed; Field work in botanical and zoological collecting in South Eastern Nebraska; Studies in Materia Medica and Pharmacy with Coolidge Bros., Pharmacists, Rochester, N. Y.

1879.

Continued studies in Materia Medica and Pharmacy; Organised the Rochester Society of Natural Sciences, (now the Rochester Academy of Sciences, acting as Secretary of same;) Entered the Medical Department of the University of Pennsylvania; Appointed Demonstrator in the Chemical Laboratory of that Department.

1880.

Pursued courses of study in the Medical Department and in the Department of Philosophy, Auxiliary to Medicine, University of Pennsylvania; Studies in Comparative Osteology and Zoology in Ward's Natural History Establishment, Rochester, N. Y.

1881.

Continued courses of study in the Medical and Auxiliary Departments of the University of Pennsylvania; Assistant Surgeon in the Free Dispensary in St. Mary's Street and in the Presbyterian Hospital, Philadelphia, under Dr. Wm. Dulles.

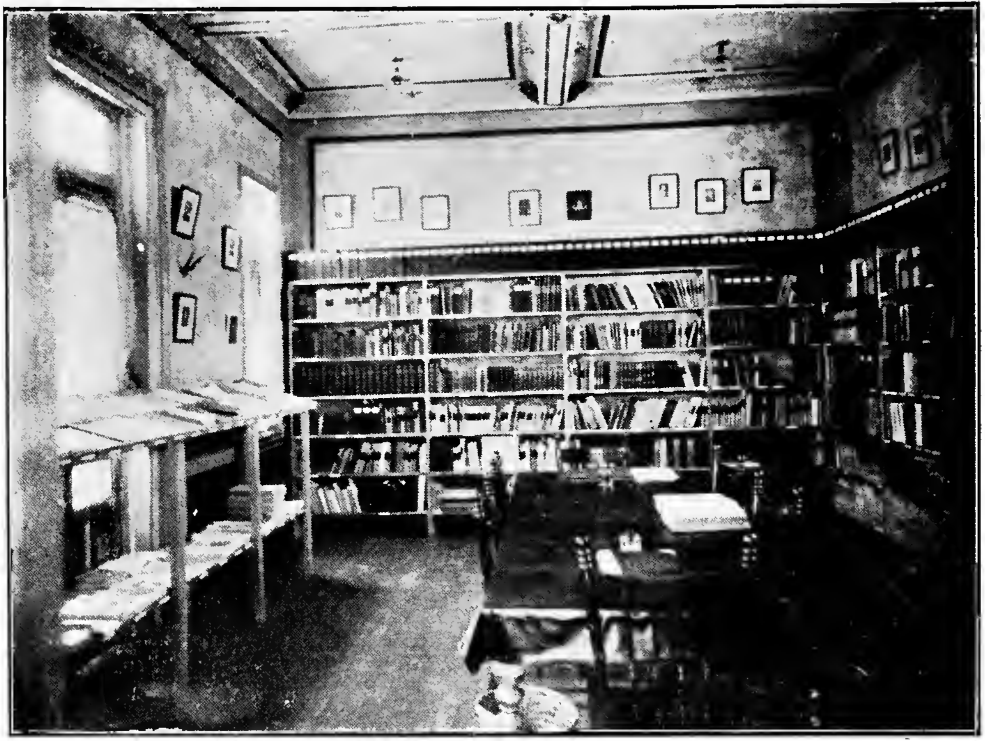

FIG. 8. PART OF LIBRARY.

1882.

Completed courses and study and graduated Doctor of Medicine from the University of Pennsylvania; Established practice of Medicine, Rochester, N. Y.

1883.

Continued in medical practice; Entered Johns Hopkins University, Department of Biology, for advanced studies in Comparative Morphology under Prof. W. K. Brooks; Studies in Marine Biology at the U. S. Fish Commission Station at Woods' Hall, Mass.

1884,

Completed studies in Johns Hopkins University; Received appointment from the University of Pennsylvania to a Traveling Fellowship in Biology; Entered the Zoological Institute of the University of Leipzig, Germany; Studies in Parasitology under Prof. Rudolf Leuchart, and in Bacteriology under Prof. Z. Weigert; Received appointment from the University of Pennsylvania to occupy a table at the Marine Zoological Institute, Naples, Italy.

1885.

Completed studies in Naples Zoological Institute; Appointed Assistant Professor of Biology in Swarthmore College, Swarthmore, Pa., and in the University of Pennsylvania; Organized Courses in Biology in these Institutions.

1886.

Appointed Professor of Biology in Swarthmore College and at the University of Pennsylvania, Department of Biology, Department of Philosophy and Veterinary Department; Studies in the Flora and Fauna of the Bermuda Islands, with headquarters at Hamilton, Bermuda; Studies of the Insect Fauna of Luray Cavern, Virginia; Established the Museum of Swarthmore College.

1887.

Conducted regular courses of Lectures and Laboratory work, University of Pennsylvania and Swarthmore College; Director, Laboratory of Marine Biology, Nassau, N. P, Bahama Islands; Collections of museum specimens for the University of Pennsylvania, Swarthmore College, Wagner Institute and the Academy of Natural Sciences, Philadelphia.

1888.

Conducted regular courses of Lectures and Laboratory Instruction in the University of Pennsylvania and Swarthmore College; Dean of the Faculty of Biology, University of Pennsylvania; Studies in Economic Botany in the Landwirthschaftliches Institut and in the Gewerbehochschule, Berlin, Germany.

1889.

Conducted regular courses of Lectures and Laboratory Instruction, University of Pennsylvania; Founded and directed the Laboratory of Marine Biology, Sea Isle City, New Jersey; Studies of the Marine Fauna of the New Jersey coast and of the artificial propagation and cultivation of Oysters.

1890.

Conducted regular courses of Lectures and Laboratory Instruction in the University of Pennsylvania; Visited the Marine Biological Laboratories of Germany, Holland, Belgium, France and England; Studies in Animal and Plant symbolism in the Kaiserliche Kuntzgewerbe Museum, Berlin, Germany.

1891.

Conducted regular courses of Lectures and Laboratory Instruction in the University of Pennsylvania; University Extention Lecture Course at the Wagner Institute of Science, Philadelphia; Lecturer on Botany, Philadelphia High School; Director of the Summer School of Natural Science, Avalon, New Jersey; Special work on the improvement of filaments for incandescent electric lamps; Technical expert in suits concerning the structure and control of incandescent filaments; Investigated the cause of the great fatality among the fishes of Lake Ontario (See bibliography).

1892.

Conducted regular courses of Lectures and Laboratory Instruction in the University of Pennsylvania, in the Central High School, Philadelphia, and in the Avalon summer-school of Natural Science; Elected Professor of Biology in the Central High School; Research on the influence of high pressures of inert gases on the organisms of fermentation; Designed carbonating and bottling machinery for Food Preservation Co., Philadelphia; Editor of Biologic Terms in the Standard Dictionary of the English Language, (Funk & Wagnalls Co.), New York, and to the Illustrated Dictionary of Medicine, Biology and Allied Sciences, (P. Blakiston's Son & Co.), Philadelphia.

1893.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, Philadelphia, the School of Pedagogy and the Avalon summer-school of Natural Sciences; Lecturer on the History of the Natural Sciences, in the School of Pedagogy, Philadelphia; continued Lexicographical work; Studies on the use of organic acids in electrolytic fluids; Introduced improvements in the refining of vegetable oils, the manufacture of compound lard, margarine, etc.

1894.

Continued regular courses of Lectures and Laboratory Instruction in the Central High School and the School of Pedagogy, Philadelphia; Lecturer on Commercial Geography, and on the Natural History of Raw Materials, in the Philadelphia School of Commerce; Completed editorial work for Dictionaries; Studies of the nitrifying bacteria of leguminous plants.

1895.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Established claires and fattening-beds for Oyster propagation on Broadwater Island, Virginia; Investigated the Oyster grounds of Chesapeake Bay and contiguous waters.

1896.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Investigation of the limnoplankton of Woodward's and Breed's Ponds, Cheshire County, New Hampshire, and of the haliplankton of Chesapeake and Delaware Bays, and of Ludlam's Bay, N. J.; Invented the Planktenokrit.—(See bibliography).

1897.

Conducted regular courses of Lectures and Laboratry Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Established the Laboratory of Industrial Biology, (Bourse Building) Philadelphia, for studies in the processes of tanning, gluemaking, brewing, food preservation, etc.; Introduced the use of Formicaldehyd and Lactic acid in the tannage of morocco leather; Introduced the use of metallic carbides as electrodes in arc lamps.—(See U. S. Patents).

1898.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Organized and directed the Laboratory of Biology of the J. B. Stetson Hospital, Philadelphia; Investigation of the value of antiseptics in soap making; Technical Expert in suits of the Patent Tannage Company, Philadelphia.

1899.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Devised improvements in can-making machinery designed to do away with the use of inside soldering, for the Delaware Bureau Can Company, Philadelphia and Wilmington.

1900.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, School of Commerce and the School of Pedagogy, Philadelphia; Introduced additional improvements in the use of Formicaldehyde in Tannage (See United States Patents); Organizer and President of the Pennsylvania Plantation Company; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Associate Editor, Philadelphia Medical Journal.

1901.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Associate Editor, Philadelphia Medical Journal; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Introduced Improvements in Disinfectants and Disinfecting Apparatus for the Philadelphia Automatic Disinfector Company; Field Work and Investigation of the Deposits of Arsenical Pyrites in Salem County, Virginia; Prospecting for Bauxite, Graphite, Monozite, Asbestos, Mica, etc., in the mountains of Virginia and other southern States.

1902.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Associate Editor of American Medicine, Philadelphia; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Study of the Economic Plants of Cuba, Porto Rico, Mexico and Florida for the Philadelphia Commercial Museum.

1903.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, School of Commerce and the School of Pedagogy, Philadelphia; Associate Editor of American Medicine; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Further studies on the Economic Flora of Florida, Cuba and Mexico; Investigation of the manufacture of Banana Flour and other Banana Products; Technical Adviser and Director of the Banana Coffee and Food Company, Philadelphia.

1904.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Deparmental Editor of Sajou's Annual of the Universal Medical Sciences; Investigation of Electrolytic processes for the manufacture of Alkali; Continued studies on the Economic Flora of Florida and Mexico; Study of the *Asclepiadeae*, *Apocynaceae*, and *Euphorbiaceae* of New Jersey aad the Southern Atlantic States, in reference to their production of gums and resins, with special reference to Caoutchouc.

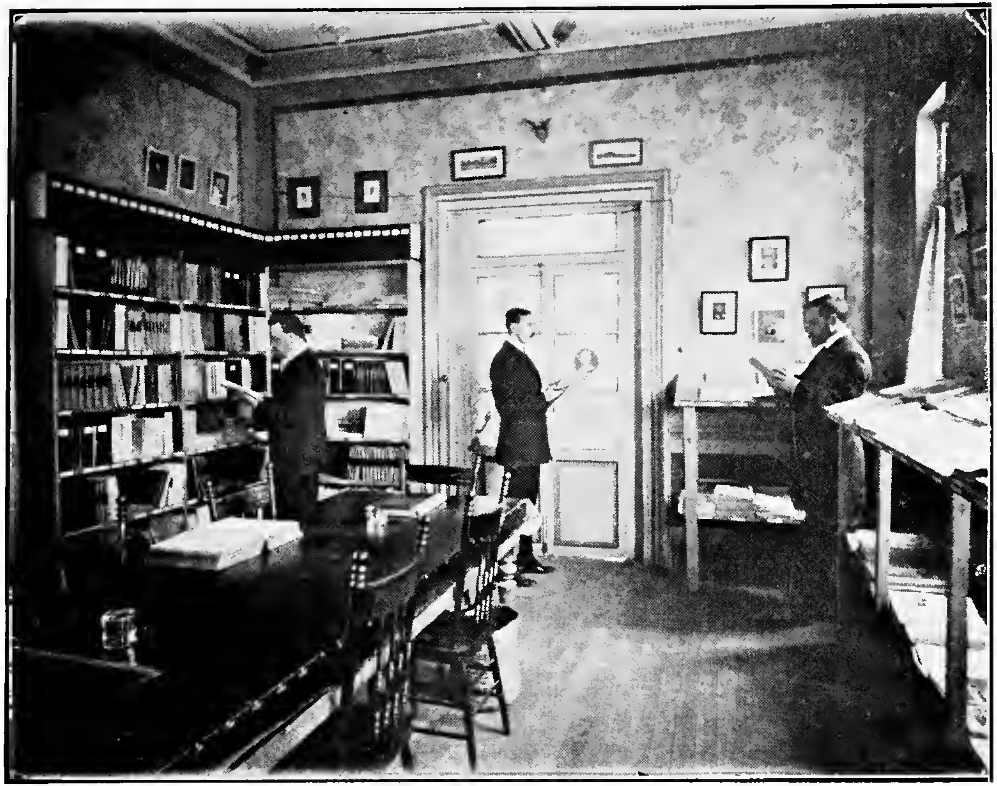

FIG. 9. LIBRARY.

1905.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Organizer and President of the Canadian Consolidated Coal Company, Philadelphia; Installed colliery works at Port Malcolm, Richmond County, Cape Breton, N. S.; Treasurer of the Nielsen Electrolytic Alkali Company, Washington, D. C.

1906.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Introduced Improvements in the manufacture of Milk Flour, Desiccated Yeast, etc., for the International Flake Products Co., New York; Investigation and Report to New York Capitalists on Guayule and on the Prampolini patents for the extraction of rubber from Guayule; Made Investigation of the McKnight process for the extraction of metals, Brooklyn, N. Y.; Field Work on the mineral deposits of Lewis County, New York.

1907.

Relinquished teaching positions to pursue special work in industrial biology and chemical engineering; Investigation and Report on the tanning and leather industry of Mexico for the Mexican National Packing Company. (See Bibliography); Study of the European Hide Market for the same Company.

1908.

Reports to Mexican Government on the Sanitary Inspection and Control of Food Stuffs submitted to the Consejo Superior de Salubridad, through the Mexican National Packing Co.; Introduced Improvements in the manufacture of Blood Albumen and other By-products; Investigation and Report on the Ogilvie System of Continuous Extraction of oils, resins, etc., at Harwich and London, England, for the British and Mexican Trust Co., London; Study of Mexican Tanning materials for the Mexican National Leather Co.

1909.

Investigation of the rubber producing plants of Mexico; Introduced improvements in the methods of preserving food stuffs, meats, etc., during shipment, (See Mexican Patent). Installed electrolytic plant for the manufacture of Hypochlorite Disinfectant Solution, (Hermite System); Installed plant for the manufacture of Blood-albumen, Gelatine, Glue, etc.; Installed Destructive Distillation plant for the manufacture of Ammonia sulphate and other products from packing house waste; Studies as to the possibility of cultivating certain medicinal plants indigenous to Mexico; Investigation and report on "Jonote" and other trees suitable for the manufacture of paper pulp and indigenous to Mexico; Studies in regard to the production of Chicle and Allied Gums, for Gum and Sweetmeats Co,, New York; President, Mexican Tannic Acid Co., Ltd., Mexico.

1910.

Continued investigation of the native rubber producing plants of Mexico; Made special studies in the utilization of various oil producing plants in Mexico; Introduced improvements in the method of preserving organic liquids (See Mexican Patent); Installed plant for the manufacture of Milk Flour for the Clean Milk Co., Mexico; Installed plant for the manufacture of concentrated milk by cold process, same Company; Installed plant for the manufacture of products from the *Agave;* Director, Compañia de los Productos del Maguey, S. A.; Director, Compañia Mexicana Manufacturera de Artefactos de Hule, S. A.; Director, Standard Rubber Corporation of Mexico, Ltd.; Director, Compañia Mexicana Explotadora de Hule Nativo, S. A.; Delegate of the Franklin Institute of Philadelphia and of the University of Syracuse, at the inauguration of the National University of Mexico; Associate Editor, American Review of Tropical Agriculture; Biologist to Tezonapa Botanical Station, since June, 1910.

Member, Rochester (New York) Academy of Natural Sciences; Rochester Pathological Society; Monroe County, (N. Y.) Medical Society; American Microsocopical Society; Society of American Naturalists; American Chemical Society; American Society of Leather Chemists; American Philosophical Society; Franklin Institute; Philadelphia Academy of Natural Sciences; Zoological Society, Philadelphia; Education Society, Philadelphia; Philadelphia County (Pa.) Medical Society.

PUBLICATIONS.

1881.

1. Bacteria. The smallest of living organisms. By Dr. Ferdinand Cohn. Translated by Charles S. Dolley.—Rochester, N. Y., pp. 30, one lithographic plate, 22 figures.

1882.

2. The physiology of Protoplasmic Motion. By Th. W. Engelmann, M. D., Translated by Charles S. Dolley, M. D.—Rochester, N. Y. [Davis & Leyden].

1883.

3. Vibratile Cilia and Ciliary Motion.—American Monthly Microscopical Journal, Apr., May, June, 1883.

4. Bacteria as Beneficial and Noxious Agents.—Paper read before the Rochester Society of Natural Sciences.—New Medical Era and Sanitarian, Vol. I, No. 34.

5. Some Observations opposed to the Presence of a Parenchymatous or Intra-cellular Digestion in *Salpa*.—Univ. Circulars, 35, p. 15 (Johns Hopkins Univ).—Zool. Anzeiger, vol. 7, No. 184, p. 705.

6, On the Process of Digestion in *Salpa*.—Proc. Acad. Nat. Sci. 1884. p. 113;—Ann. and Mag. Nat. Hist, [5] Vol. 14. July, p. 72.—Journ. Roy. Mic. Society, Vol. 4, p. 5, p. 732.

7. On a Cilio-flagellate Infusorian [*Peridinium apiculatum*] recently observed in Baltimore drinking water.—Univ. Circulars [J. H. U[. 29, p. 60;—Ann. and Mag. Nat. Hist. [5] vol. 13, May, p. 418.

1884.

8. Linnaeus' "Golden Statue" for Dr. Patrick Browne, who first introduced *Spigelia* to the medical public.—Philadelphia Medical Times, 1884.

9. On the Role of *Leucocytes* as Prophylactic Agents.—Philadelphia Medical Times, 1884.

1885.

10. The Technology of Bacteria Investigation. Explicit Directions for the Study of Bacteria, their culture, staining, mounting, etc:. according to the methods employed by the most eminent investigators. 12 mo. 263 pp.—Boston. [S. E. Cassino & Co. [

1886.

11. On the *Helictites* of Luray Cave.—Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 351-2.

1887.

12. On the Histology of *Salpa.*—Proc. Acad. Nat. Sci. Phila. Sept. 27, 1887.

13. Preliminary Abstract Report of the Marine Laboratory stationed at Nassau, New Providence.—Annual Report of the Provost for the year ending October 1, 1887, Univ. of Penna.

1888.

14. From 1888 to 1895, Editor of the Department of "Animal Parasites and their Effects "in Sajou's *"Annual of the Universal Medical Sciences,"* published by Davis & Co.,—Philadelphia, Pa., 1888 to 1895.

1889.

15. Notes on the Methods employed in Biological Studies, compiled solely for the use of students in the Laboratories of the School of Biology.—Published by the University of Pennsylvania.

16. Provisional List of the Plants of the Bahama Islands; by John Gardiner, B. S. Lond. [Prof. of Biology, University of Colorado] and L. J. K. Bruce [Assistant to the Botanical Gardens, Calcutta].—Arranged and presented for publication by the Authors' permission, with notes and additions.—Proc. Acad. Nat. Sci. Phila., 1889, pp. 349-426.

17. The Botany of the Bahamas.—Proc. Acad. Nat. Sci. Phila., 1889, p. 131-134.

1891.

18. Cause of the Fatality among the Fish of Lake Ontario.—Rochester Post Express, July, 1891.

1893.

19. Review of "A Manual of Bacteriology by Geo. M. Sternberg".—Medical News.

20. The Tyrsos of Dionysos and the Palm Inflorescence of the Winged Figures of Assyrian Monuments.—Read before the American Philosophical Society Feb. 17. 1893—Proc. Amer. Philos Soc. Vol. XXXI.

21. Science Teaching in the Schools.—Abstract of an address read before the Education Club of Philadelphia, Pa., March 24, 1893.—Published as Pamphlet by the American Association for the Advancement of Education, 1893.

22. Review of Minot's "Human Embryology."—Medical News.

23. Review of Piersol's "Text Book of Normal Histology."—Medical & Surgical Reporter, Dec. 16, 1893.

24. Review of Schenk's "Manual of Bacteriology."—Medical and Surgical Reporter. Dec. 16. 1893.

25. On the Responsibility of School Teachers as regards Nature Studies. Address delivered before the Friends' Teachers Association, Philadelphia, October 21. 1893. The Pedagogue.

26. [With J. McKeen Cattell]. On Reaction Times and the Velocity of the Nervous Impulse. Psychological Review, Vol. 1, No. 2. March 1894. Abstract of a paper presented before the Meeting of the National Academy of Sciences, Albany, 1893.

27. [With J. McKeen Cattell]. On Reaction Times and the Velocity of the Nervous Impulse. Presented by Prof. G. F. Barker before the meeting of the National Academy of Sciences, Albany, 1893. National Acad. of Sci. Vol. VII, Second Memoir.

1894.

28. Editor of Biological & Scientific Terms in "An Illustrated Dictionary of Medicine, Biology and Allied Sciences," Philadelphia, P. Blakiston's Son & Co.

29. Synonymatic Table of Bacteria in Illustrated Dictionary of Medicine, Biology and Allied Sciences, Blakiston's Son & Company. pp. 157–186.

30. Synonymatic Table of Animal Parasites of Man and of the Animals commonly associated with him. *Ibidem.* pp. 978-1021.

31. Conspectus of Pigments, *Ibidem.* pp. 1085-1100.

32. Table of Stains, Fluids for Fixing, Hardening Media for Examination and Preservation, etc., and Methods Employed in Biologic Examination. *Ibidem.* pp. 1367–1406.

33. The Etiology of *Carcinoma.* Philadelphia Medical Journal, 1894.

34. Review of Bütschli's Investigations on Microscopic Foams and on Protoplasm." Amer. Journ. Med. Sci. Phila.

35. Obituary notice of John M. Maisch. Proc. Amer. Philos. Soc. Dec. 7, 1894.

1895.

36. Evil Effects of Drifting Sands along the Jersey Coast. New Jersey Forester, Vol. I, Jan. 1, 1895. No. 1.

37. Member of the Editorial Staff [Biological Terms] of the Standard Dictionary of the English Language. New York. [Funk & Wagnall's]. 1893–1895.

38. Review of "Biological Lectures delivered at the Marine Biological Laboratory of Wood's Hall. Science, 1895.

1896.

39. The Planktonokrit, A Centrifugal Apparatus for the Volumetric Estimation of the Food Supply of Oysters and other Aquatic Animals.—Proc. Acad. Nat. Sci. Phila., May, 1896, p. 276–289.

40. Sur l'Emploi d'un Appareil Centrifuge pour les Recherches sur le Plankton.—Comptes rendus des seances de la Congres International les Perches Maritimes, d'ostreiculture and d'aquiculture marine, Paris, 1896, pp. 168–170.

1897.

41. Bacteriology.—[The American Educator" Syndicate Publishing Co]. Philadelphia, 1897, pp.

42. Chapter on Embryology, in Davis' "Manual of Obstetrics," [Blakiston's Son & Co]. Philadelphia.

43. Improvements on Tanning Hides & Skins.—British Patent, No. 12,099, July 24, 1897.

1899.

44. Certain New and Useful Improvements in Methods or Processes of Treating Hides, Skins and Leather.—United States Letters Patent No. 629,124. July 18, 1899.

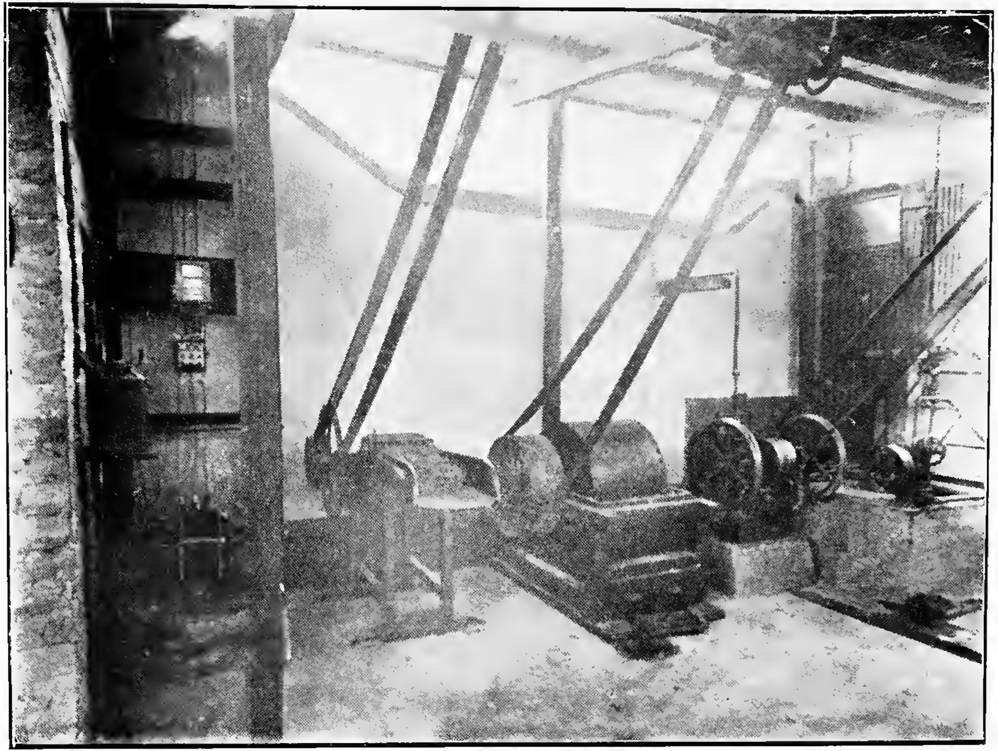

FIG. 10. EXPERIMENTAL FACTORY.

45. Certain New and Useful Improvements in Processes of Tanning. —United States Letters Satent, No. 630,494, August 8, 1899.

46. Editor of Biological & Scientific terms in "A Dictionary of New Medical Terms," being a supplement to the Illustrated Dictionary of Medicine, Biology and Allied Sciences. —P. Blakiston's Son & Co.— Philadelphia, 1900–1904.

47. Certain New and Useful Improvements in Processes of Treating Hides, kins or Leather.—United States Letters Patent, No. 642,519, January 30, 1900.

1902.

48. Harvard's Medical Endowment. American Medicine, April 12, 1902.

49. Dr. Woodbury's Raffle Plant. American Medicine, April 12, 1902.

50. Therapeutic & Nutritive Value of Alcohol. American Medicine, March 29, 1902.

51. A Contention as to *Stegomyia*. American Medicine, March 29, 1902.

52. The Mosquito Problem in New Orleans. American Medicine, March 29, 1902.

53. A Mayor as a Medical Censor. American Medicine, Apr. 5, 1902.

54. Early Medicine in the U. S. American Medicine, Apr. 5, 1902.

55. Early Use of Mercury in Syphilis. American Medicine, Apr. 5, 1902.

56. Retirement of the Surgeon-General of the Army. American Medicine, Apr. 19, 1902.

57. The Effects of Regents' Examinations upon Nervous Children. American Medicine, Apr. 19, 1902.

58. A Victory over the Substitution Evil. American Medicine, Apr. 19, 1902.

59. The Medical Profession and Organized Charity. American Medicine, June ·1902.

60. Oral Pathology and General Medicine. American Medicine, June 1902.

61. The Relation of Teratogenesis to Pathogenesis. American Medicine, June 1902.

62. The Nomenclature of Syphilis. American Medicine, June 1902.

63. Hereditary Fecundity and Hereditary Sterility. American Medicine, 1902.

1908.

64. Report on the Tanning and Leather Industry of Mexico. Report prepared for the Mexican National Packing Co., turned over to Arthur P. Butman, Special Agent, and published by the Department of Commerce and Labor. Washington, D. C.

1909.

65. Mejoras en la Preservación de Productos Animales y Vegetales. Patente de Invención No. 8183, Estados Unidos Mexicanos.

66. Mejoras en la Elaboración de Preparaciones pulverulentes de Materias Animales y Vegetales; Patente de Invención No. 8923, Estados Unidos Mexicanos.

1910.

67. Ciertas nuevas y útiles mejoras en el beneficio de Aguamiel. Patente de Invención No. 10920, Estados Unidos Mexicanos.

68. Nuevo procedimiento para la concentración de Aguamiel. Patente de invención, Estados Unidos Mexicanos.

CHEMIST. *

Frederich Kaye.

Born May 7th, 1866 at Greetland, Halifax, England. Educated Greetland Public School and at Greetland Technical School, Halifax, where he won distinction in Science and Art examinations, including first Class Honors in Practical Chemistry; awarded Government Scholarship at Royal College of Science, London, for three years, 1889; Associate in Chemistry, Royal College of Science, 1889–92; Student Electrical Engineering at Yorkshire College, Leeds; Bacteriology at King's College, London; Radio-Activity and Enzymology at University College, London.

Lecturer in Science, Malmesbury Technical School, Wiltshire, 1892; Stockport Technical School, Lancashire, 1894; Gravesend Technical School, Kent 1896; Lecturer in Physics and Demonstrator in Practical Physics and Electrical Engineering, Bradford Technical College, 1897–1902; Colleague to Dr. Philip Schidrowitz, London, in special chemical research and general analytical practice, chiefly dealing with problems related to the Distillation and Brewing Industries, and to the Rubber industry, both as to Rubber Production and Manufacturing Processes, 1902–08; Expedition to Uganda, British Central Africa, in March 1909, on the invitation of the Mabira Forest Rubber Company, to investigate methods on coagulation of Funtumia elastica, and to effect improvements in the rubber, as well as to experiment on other latices and materials obtainable in the Mabira forest. Results of discoveries have not yet been published; Special investigation regarding Synthetic Rubber Processes, in London, 1909–10; Chemist, Tezonapa Botanical Station, since March 1910.

Member, Society of Chemical Industry, London; Faraday Society, London.

PUBLICATIONS.

1905.

1. [With Philip Schidrowitz]. Some conditions affecting the ether values of brandy.—Read before the Society of Public Analysts, London. —The Analyst.

2. [With Philip Schidrowitz] The Determination of Higher Alcohols in Spirits. I.—Read before the Society of Public Analysts, London.—The Analysts, June 1905.

3. The Chemistry of Whiskey.—Read before the Society of Chemical Industry, London.—Journal Society Chemical Industry.

1906.

4. [With Philip Schidrowitz]. The Determination of Higher Alcohols in Spirits. II. Read before the Society of Public Analysts.—The Analysts, 1906.

5. [With Philip Schidrowitz]. The Disposal of Waste Yeast.—Journal of Federated Institute of Brewing.

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* Resigned, October 3rd, 1910.

6. [With Philip Schidrowitz], The Distillation of Whiskey.—Journal Federated Institute of Brewing.

1907.

7, [With Philiph Schidrowitz]. On the Composition of some Crude Rubbers.—Journal Society of Chemical Industry, Feb. 28th, 1907.

8. (With Philip Schidrowitz). Analyses of some Rubber Tyres.—Journal Society of Chemical Industry, Feb. 28th, 1907.

9. (With Philip Schidrowitz). Note on the inference of Formaldehyde on the proporties of the Latex of *Funtumia elastica.* Journal Society of Chemical Industry, Dec. 31st, 1907.

1908.

10. (With Shilip Schidrowitz). The Influence of the Method of coagulation on the physical and chemical properties of *Funtumia elastica.* India Rubber Journal, Sept. 23rd, 1907.

11. (With Philip Schidrowitz). An abnormal rubber latex.—India Rubber Journal, 1907.

During the prolonged sittings of the Royal Comission on Whiskeys London, 1908, the papers referring to Determination of Higher Alcohold in Spirits and on Distillation of Whiskey, as well as other unpublished work, were much quoted in evidence and were ordered to be reproduced in full in the appendix to the published report of the Comission.

1910.

12. Rubber Cultivation in Uganda.—India Rubber Journal, March 1910.

IN PRESS.

18. Study of *Castilla* latex.—Am. Rev. Trop. Agri., vol. I.

INDUSTRIAL CHEMIST.

George Wannag.

Born September 20, 1870, in Smolensk, Russia. Graduated Chemical Engineer, Agricultural College, Gorji Gorki, Russia, 1893; Student, University of St. Petersburg, 1894; Lieuttenant in Russian Army; Comptroller of Countess Zakatow's Estates, Tula, Russia; Constructed factories for destructive distillation of wood in various parts of Russia; Contractor to the Russian Government for refining alcohol; Consulting Chemical Engineer in Canada and in the United States; Chemist to National Packing Company in Mexico; Imperial Russian Consul in Mexico, since 1910; Industrial Chemist to Tezonapa Botanical Station, since December 1908.

AGRICULTURIST.

Rolf Gustaf Rafael Olsson-Seffer.

Born January 13, 1880, in Finland. Educated Swedish Reallyceum, Abo, Finland; Graduated Horticultural School, Abo; Assistant Gardener, Royal Gardens, Ulriksdal, Sweden, 1898–99; with Marybourough Sugar Company, Australia, 1899–1900; Engaged in sugar culture in Queensland, 1900–04; with Colonial Sugar Refining Company in Australia, 1904; In

Agricultural pursuits, Erewhow Station, New Zealand, 1905; Traveled Hawaii, California and Guatemala, 1905; Assistant, La Zacualpa Botanical Station and Rubber Laboratory, Mexico, 1905–06; In charge of station, June to November, 1906; Manager, El Dorado Rubber Plantation, Chiapas, 1906–07; Manager, El Palmar Coffee, Sugar & Rubber Estate in Veracruz, 1907–08; Manager, La Luisa and Laguna Chica Coffee, Rubber & Banana Estates in Veracruz, 1908–10; Resident Manager, Doña Maria Rubber Estate. Chiapas, June to October, 1910; Agriculturist, Tezonapa Botanical Station, since December, 1908.

Member, National Geographic Society.

IN PRESS.

Publications.

1. [With Pehr Olsson-Seffer). Measurements of Rubber Trees in Southern Mexico.—Am. Rev. Trop. Agr., vol. I.

AGRICULTURIST.

Carl Albert Edward Thimgren.

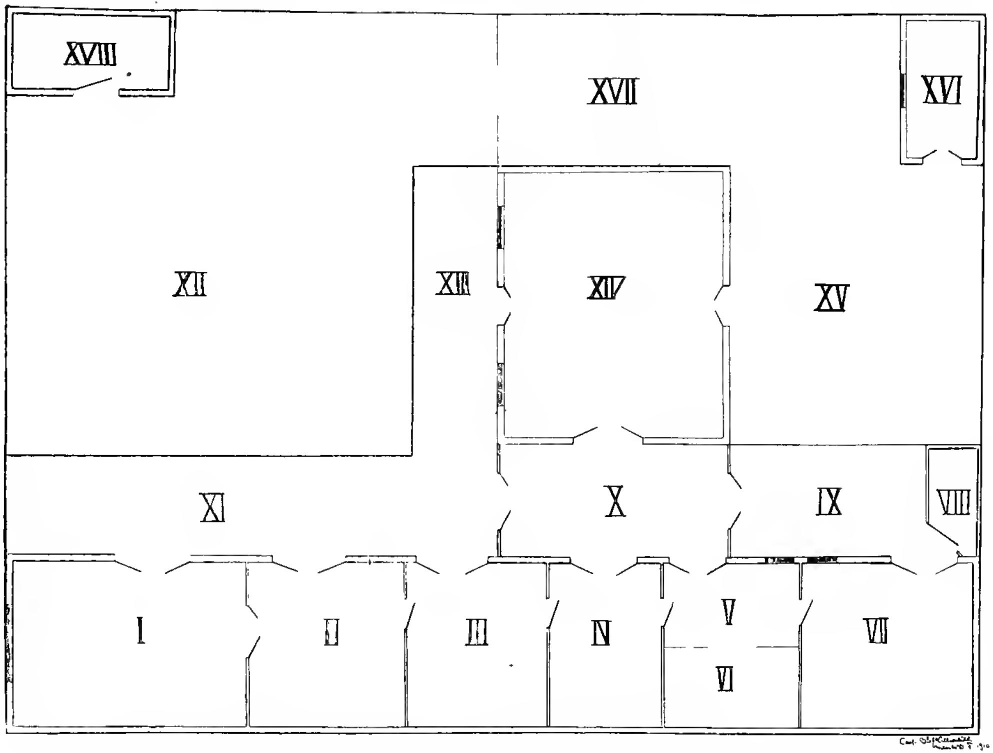
Born March 7, 1868, in Kristianstad, province of Skane, Sweden. Educated, High Schools of Upsala and Jonkoping, Sweden; Norra Latin larovarket (College), Stockholm, Sweden, and Polytechnicum, Dresden, Germany.

Emigrated to the United States in 1887; Resided in Chicago until 1892 and was during that time engaged in drug business, journalistic and literary work; Editor of "Skandia" Sioux City, Iowa, 1892–1893; Engaged in drug business in Des Moines, Iowa, and Kansas City, Mo., 1893–1894; Local Agent at Tampico, Mexico, for "The Old Mexico Colonization Society" and Manager of said Corporation's Hacienda in the Huasteca Veracruzana, 1895–1898; Assayer, La Gran Fundicion, Aguascalientes, Mexico, 1898–1899; Assayer and Contractor, El Oro, Mexico, 1899–1900; Manager, Standard Light Co., Mexico City, 1900–1902; Examination of lands in Mexico; Engaged in Real Estate, Brokerage and Commission business, Mexico City, 1902–1909; Secretary and Manager, Pan-Mexican Realty & Securities Co., since March, 1909; Agriculturist, Tezonapa Botanical Station, since September, 1910.

FORESTER.

William Edward Lloyd.

Born 1861, in Liverpool, England. Educated in Liverpool and at Schools in North Wales, where one of the masters under whom he graduated was Professor Rhys, of Jesus College, Oxford Uuiversity; Served his apprenticeship as a ship broker in Liverpool; traveled in north of Spain, West Indies and the



I. Director's Office. II. Morphological Laboratory. III Plant Physiological Laboratory. IV. Sample Room V. Chemist's Office. VI. Store Room. VII. Chemical Laboratory. VIII. Dark Room. IX. Verandas. X. Investigator's Room. XI. Verandas. XII. Garden. XIII. Verandas. XIV. Library. XV. Experimental Factory. XVI. Store Room, XVII. Shop. XVIII. Caretaker's Cottage.

United States; Later traveled in Canada and the United States, most of the time in the latter country in the South and on the borders of Indian territory, especially in the part of the country well known as the Cherokee Strip among the Ponca and Pawnee Indians; After two years in England, left in 1893 for Northern Wisconsin, where he was engaged in lumbering; Engaged in gold-mining in New Mexico, making long trips among the Navajo and Cochite Indians; With the Supply Department of the Gulf, Colorado and Santa Fé Railroad; Came to Mexico in 1906, and has been engaged in tropical agriculture and practical forestry, having visited every State and Territory in the Republic, especially examining mahogany and zapote lands of Tabasco and Campeche, timber reserves in Quintana Roo and the pine and oak forests of Guerrero.

ASSISTANT BOTANIST.

Runar Ivar Olsson-Seffer.

Born December 20, 1883, in Finland. Educated Swedish Reallyceum, Abo, Finland; Leland Stanford Jr. University, California, 1096–07; University of California 1906, 07, 08. Pomona College, California, 1908–09; Engaged in sugar and tropical fruit culture in Queensland, 1901–04; with Colonial Sugar Refining Company in Australia 1904; Traveled in Australia 1901–04; In Peru and Chile. 1904–05; In Hawaii, 1905–06; Botanical expedition, Queensland, Australia, 1903; Member of Dr. Lander's Geological Expedition to Sierra de Pasca, Peru, 1904; Botanical expedition in Mexico, 1909–10; Reported on rubber and sugar estates in Mexico, 1909–10; Investigated Hardwood Forests in Mexico; General Manager, La Luisa Lumber Co.; Assistant Botanist, Tezonapa Botanical Station, since January 1909.

Member, National Geographic Society; American Forestry Association.

PUBLICATIONS.

1910.

1 The Semi-tropical Grasses of Australia. Am. Rev. Trop. Agr., vol. 1, 43–51.—Translated extracts under title "Les herbages semi-tropicaux de l'Australie" in L'Agronomie Tropicale, vol. II, pp. 96–99.

2. The Castor Oil Plant [*Ricinus communis* L.] Am. Rev. Trop. Agr., vol. I, 102–107 [Contrib. Tez. Bot. Sta. No. 4.] Also Reprinted.

3. Causes of Destruction of Agricultural Land in Mexico. Am. Rev. Trop. Agr., vol. I. [Contrib. Tez. Bot. Sta. No. 7.]

IN PRESS.

4. The Useful Agaves of Mexico. Am. Rev. Trop. Agr., vol I.

5. Botanical and Chemical Study of Chicle. Am. Rev. Trop. Agr,, vol. 1.

6 *Sesamum indicum* L. and its occurence in Mexico. Am. Rev. Trop. Agr., vol. 1.

7. [With Pehr Olsson-Seffer] The Sugar Cane Industry and its Progress. Am. Rev. Trop. Agr., vol. I.

ASSISTANT TO DIRECTOR.

Carl-Olof Lillieskold.

Born January 27, 1886, in Stockholm, Sweden. Graduated from Stockholm University, 1907; Graduate from Military Academy of Sweden, 1909; Student, University of Stockholm, 1908-10, studying Chemistry under Dr. Hans von Euler and Botany under Prof. G. von Lagerheim; Lieutenant in the Reserves of Royal Uplands Artillery Regiment, Sweden, since 1909; Traveled in Southern Mexico, 1910; Assistant to Director, Tezonapa Botanical Station, since May 1910.

Member, National Geographic Society.

PUBLICATIONS.

IN PRESS.

1. Study of *Argemone mexicana* L. or Mexican Poppy. [Contrib. Tez, Bot. Sta.]—Am. Rev. Trop. Agr. vol. I.

FIELD ASSISTANT.

Einar Holger Schach Jensen-Valeur.

Born, Helsingoer, Denmark, March 26, 1874. Educated at Helsingoer Latinskole, Denmark, and Royal Naval College, Copenhagen; Served apprenticeship as a clerk in Germany for two years; Traveled in Argentine, Chile and Peru from 1891–97; in lumber and export business in Denmark, 1897–1909; Came to Mexico September 1909; Field Assistant, Tezonapa Botanical Station, since June, 1910, investigating native rubbers of Mexico.

COTTON EXPERT.

David Thomatis.

Born August 3, 1849, near Porto-Maurizio, Italy. Educated Technical Institute of Porto-Maurizio, 1866; Turin Superior Institute 1868; Professor of Technology, Political Economy and the English Language, Technical Institute, Pinerolo (near Turin), 1869-71; Assisted Prof. Arnaudon in researches on aniline dyes and in the organization of the Turin Technological Museum; Delegate from Piedmont to the First General Italian Congress of Agriculturists held in 1870 in Pistoria near Florence and elected President of the Section on "Agricultural Credit"; Proposed a system of Agricultural Credit, which was approved by the said Congress and then formed an Agricultural Bank based on this system in Piacenza, for which bank remained as manager 1871-72; Traveled in England 1873; Under-principal and Mathematical Master

High Harrowgate College 1874; Went to Australia 1875; Assisted Prof. Pearson in reorganizing Melbourne University 1877.

Exploring in New Guinea 1878, being the first to cross the Owen Stanley Range from West to East and being the first to discover gold in New Guinea; Studied Economical Plants of New Guinea; The principal cannibal chief became his friend and took the name "Tamata" after Mr. Thomatis; The river Tamata and the town of the same name, now the second largest in British Papua, were also named after Mr. Thomatis; Settled in Trinity Bay, Northern Queensland, 1879, and on his property "Caravonica", near Cairns, cultivated the first bananas and coffee in Australia; His system of Agricultural Credit was adopted in all the six States of Australia; In 1899 developed the now famous cotton hybrid known as "Caravonica"; Traveled in East and West Africa, Cuba and finally Mexico, studying conditions for Caravonica cotton culture.

Member, Geographical Society of Turin; Pantheon of Philanthropists of Naples; Academie Parisienne des Sciences et des Inventeurs, of which holds a gold medal and a Grand Cross; Royal Geographical Society of Australasia. Published monographs and articles on Agricultural Credit in 1870 in Italy and in 1890 in Australia; On Caravonica Tree Cotton from 1900 to 1909; Memoir on Rust in Wheat in Australia, in 1882.

TEZONAPA BOTANICAL STATION

BIOGRAPHICAL NOTES OF THE STAFF.

Biographical Notes.

DIRECTOR & BOTANIST.

Pehr Hjalmar Olsson-Seffer.

Born September 14, 1873, in Ekenas, Finland. Educated in Public Schools in Finland, especially at the Swedish Classical Lyceum in Abo, 1883-92. During summer vacations 1889 and 1890 received private instruction in Botany, especially phytogeography, by Dr. G. I. Rothstrom; Attended the extensive experiments in Electro-culture, conducted by the inventor, Prof. S. Lemstrom, in Finland; While at college had 11 scholarships; Appointed leader of a botanical summer excursion to the islands in Southwestern Finland, 1891; Awarded first prize for an essay on The Distribution of Plants in the Neighborhood of Abo; Passed entrance examination to the graduate school of Helsingfors University, June 2, 1892; Graduate student, 1892-95 and 1898-99 at the Imperial Alexander's University of Helsingfors.

Record of post-graduate studies, scientific and practical work.

1891.

Excursions for botanical and ornithological purposes, in Korpo archipelago (Finland), in Aland and in Nyland.

1892.

Excursions in West-Nyland and in Aland with a student assistant, in Nagu archipelago, and in the neighborhood of Helsingfors (Finland).

During fall semester attended courses in General Botany, Inorganic Chemistry, Zoology, comprising Morphology, Development and Phylogenetic Relations, and laboratory work in Comparative Plant Morphology and Cryptogamie Botany, Comparative Anatomy, German and Latin Composition, and several courses in Medicine.

Attended the monthly meetings of Societas pro Fauna et Flora Fennica during 1892-95 and 1898-99, and also the meetings of the Botanical Club of the University, where contributed frequently on botanical and ornithological topics, which contributions were published in the proceedings and annual reports of the former society for said years. Made an extended journey in Finland visiting many agricultural and forest estates for the purpose of studying methods employed.

1893.

Courses in General Botany, Vegetable Physiology, Morphology of Plants, Systematic Botany, Plantgeography, Phytopaleontology and methods of research, Zoology, Comparative Anatomy, and laboratory work on Vertebrates and Invertebrates, Ichthyology, Entomology and Classification of Insects, Physical Geography of Europe, and Practical work in Geography, Chemistry and laboratory work, Geology, Latin, German and French.

During fall semester also courses in Entomology, comprising Morphology, Habits and Distribution of Insects, and Classification, especially of Coleoptera, Climatology, and Paleontology, laboratory work, Map Projection, Sketching, Use of instruments, etc., Methods of Surveying and Leveling, Field Practice, and various courses in Medicine and Surgery, with laboratory and clinical practice; Passed public examination in the German language.

Received a fellowship for study of the flora of Kimito Island (Finland); Spent 10 weeks there and some weeks in Abo archipelago; The result was a botanical survey of the island, published in 1895 (See Bibliography). A paper (in Swedish): "Phenological notes made in Kimito 1893," was deposited in the botanical library of the Finnish Museum.

Read several papers on ornithological subjects before scientific societies and presented to Societas pro Fauna et Flora Fennica a manuscript: "Notes on the migrations of birds"; Contributed to Professor Reuter's investigations on "Herrings in fresh water lakes;" Made observations on the influence of night frosts on vegetation during this and following year for the Finnish Society of Science (Published by Dr. A. O. Kihlman in Fennia 1894 and 1895); In charge of the herbarium of the Geographical Society of Finland from October 10, 1893 to December, 1895; Secretary of an Academic society for promotion of agricultural education, in which capacity travelled and lectured throughout Finland.

1894.

Post graduate courses in Economic Botany, History of Botany, Ecology, Forest Botany, Principles of Development and Phylogeny of Plants, Cryptogamic Botany, Zoology, Anatomy, and Histology, writing of Zoological Essays, Geography, Mapping, plain and topographical surveys in the field, Methods of observing and making reductions in Triangulation; also courses in Medicine, Russian and French.

Received a fellowship for a floristical survey of Nagu archipelago, special attention to be paid to the vegetation of the beach; Spent 9 weeks there accompanied by a student assistant; "Phenological notes, made in Nagu" were deposited in the botanical library of the Finnish Museum; Several scientific papers were read at various meetings; A list of plants, found in Nagu and Korpo archipelagoes, was compiled for publication in joint authorship with A. W. Granit, M. A., Forest Engineer; Contributed to Professor Elfving's survey of cultivated plants in Finland; Collected Coleoptera in South-pen Finland for the Finnish Museum; Wrote frequently in the rublic press; Lectured on agricultural and scientific subjects.

1895.

By special permission admitted as graduate student with Master's degree to the Swedish Normal Lyceum, Helsingfors, January, 1895; Attended courses in Natural Sciences and Geography, during 1895, giving the usual number of proof lessons; As assistant in Natural Sciences conducted all the excursions with the students, and was often in charge of the botanical classes.

Received a fellowship for studies of the beachflora and vegetation in the Eastern archipelago of Aland; Traveled there ten weeks, accompanied by two student assistants, and also in Stockholm archipelago (Sweden), and in Nyland (Finland); Presented for publication in Acta Soc. F. Fl. F. two papers: "Contribution to the question of the phytogeographical boundary between Abo and Aland provinces", and "Ornithological observations in the Southern Archipelago of Abo: A contribution to the Avifauna of S. W. Finland", but both manuscripts were destroyed by fire.

Editor-in-chief of semi-weekly paper "Aland" to December 1897; Secretary of the Agricultural Society of Aland, from December 1895 to December 1897; Director of several public companies.

1896.

Studied the beachflora in Southern Aland (Finland); Accompanied by two student assistants made a nine weeks excursion in the Baltic Provinces of Russia between Reval and Riga, and on the islands of Wormso, Dago, and Oesel, especially for ecological studies; Museum and library studies at the University of Dorpat, Russia, under Prof. Dr. Edmund Russow, and in St. Petersburg under the guidance of Dr. J. Klinge; Plant collecting for Herbarium Musei Fennici and the Botanical Gardens, St. Petersburg; Collected later in Nyland and Aland for the Finnish Herbarium; Instructor in Swedish and History and temporary teacher of Natural Science, at the College of Mariehamn; As Secretary of the Agricultural Society of Aland lectured frequently on Economic Botany; Managing Director of a printing establishment in Mariehamn (Finland), 1896-97; Director of several companies and societies.

1897.

Received fellowship for hydrographical investigations in the Finnish archipelago, and spent eight weeks there with a student assistant, at the same time studying the beach vegetation; Excursions in Aland with Professor Sernander of Upsala, and with Dr. K. E. Hirn, and also on the Swedish East Coast, with two assistants; Made a monographical study of the relations between present plant covering of the shores of Lake Langtrask and the fossil remains in the neighboring peat bogs (See Bibliography); Lecturer in Natural Science, Public High School, Aland; Director of several companies; Secretary of several Educational societies.

Studied Plant Distribution, Ecology and Paleobotany, Fall semester, 1897, at the Royal University of Upsala in Sweden; Also laboratory work, carpological studies and excursions; Received advice on Methods of Research; Instruction in Quaternary Geology by Prof. A. G. Hogbom; Attended the monthly meetings of the Botanical, Geological and Zoological sections of the Natural Science Association of Upsala, of the Geographical Society of Upsala, and of the Botanical Society of Stockholm; Elected Secretary of the Geographical Society of Finland to September 1899; In charge of the Herbarium of the Society, November 1897 to August 1898; Organized 12 public libraries in various parts of Aland during the year; Commissioned by the Swedish Society for the Advancement of Aland to give a series of educational lectures throughout the country; Member of the Board of Directors and Secretary for the Public High School of Aland, from 1896–98; Excursions to the West Coast of the Gulf of Bothnia.

1898.

Re-admitted to University of Helsingfors; Studied Botany, Geography and Zoology for the degree of Doctor of Philosophy, and passed prescribed examination in Geography as major subject for that degree; Private Assistant in Biological Geography, 1898, to Dr. R. Hult, at the Geographical Institution of the University; Studied Plant Geography and Forest Botany at the Imperial University of Jurjew, Russia, 1898. Extensive botanical excursions in Western Russia; Studied Botany and Materia Medica at the University of Konigsberg, in Germany, during part of 1898; Excursions on the northern coast of Gulf of Finland with a student assistant, in eastern Finland, on the Finnish Coast of Gulf of Bothnia, studying the beachflora and vegetation; Visited for the same purpose the islands of Mohn and Oesel, and the coasts of the Gulf of Riga in the Baltic provinces of Russia in the autumn; Studied Phytogeography at Reshiza for Dr. E. Lehmann, and Phytogeography and Forest Botany at the Universities of Konigsberg and Dorpat, and Telmatology under the guidance of Dr. J. Klinge in St. Petersburg; Read papers before Societas F. Fl. F. and contributed to O. Bomansson's work "Mosses from Aland"; Visited different parts of Russia, Siberia and Northern Sweden for forest investigations.

Established a semi-weekly popular newspaper, "Vart Land", and acted as editor-in-chief from November 20, 1897 to June, 1899; General Manager of a printing establishment and publishing house in Helsingfors (Finland); Organized a Congress of Fisheries in Helsingfors, which led to several changes in the Fisheries legislation of the country; Investigated Methods of dry distillation of wood.

1899.

Instructor in Botany, College for Boys and Girls, Helsingfors; Visited the International Horticultural Exhibition in St. Petersburg; Studied Forestry in Stockholm and in Russia; Received a fellowship for researches on the beachflora and vegetation of the Baltic Sea; Excursions during the summer along the whole East and South Coasts of Sweden, on Gotland, Qeland, and Bornholm islands, on Sjaelland in Denmark and on the Baltic Coast of Germany; In the autumn, excursions along the north coast of the Gulf of Finland; Later ecological studies in Denmark, at Kiel in Germany, in Holland, and on the eastern Coast of England; Visited various European countries for studies of agricultural organization and forestry; Museum and library studies in London and Birmington (England); Elected Delegate to the International Geographical Congress in Berlin.

1900.

Botanical excursions on the North coast of France and in the neighborhood of Bordeaux; Library and Museum studies in Oxford, in British Museum, and in Kew Gardens, London, during March and April; Ecological studies in Jylland, Fyen, and Sjaelland (Denmark) and on the Swedish south and west coasts; Studies in London during August; Botanical excursions on the Devonshire coast in England, and in the neighborhood of Lisbon, Portugal, on the Spanish south coast, at Marseille, France, and in Southern Italy; Later in Egypt, Ceylon and in Western Australia, especially studying the beachflora.

Traveled in several European countries and in India, investigating Agriculture and Forestry; Studied experimental methods at a great number of agricultural stations and other similar institutions; Special Agent of the Queensland government for promoting immigration to that country.

1901.

Led a geographical and scientific expedition to the interior of Australia, six months; Chemist to Maryborough Sugar Factory, and field manager on a sugar plantation; Advisory and inspection work for the Government of Queensland in regard to colonization and land setlement; Inspected numerous agricultural estates in Tropical Australia; Investigated some of the forest problems of that country.

1902.

Studied the forests and sandflora in New South Wales, Victoria and South Australia; Advisory work in the Land Department of the Government of West Australia; Inspected numerous agricultural estates for the Government and private owners; Investigated the Eucalyptus and Acacia forests of Australia; Botanical expedition in South Sea Islands, including New Guinea, New Hebrides, Solomon and Santa Cruz Islands; Traveled in New Zealand, investigating agriculture, dairying and forestry; Studied the flora and vegetation of Samoa; Investigated the sugar industry of Hawaii; Experiments on the Influence of Electricity on plant growth.

1903.

Amanuensis in the library of the Leland Stanford Jr. University, California; Graduate student in Botany at this university from January, 1903, to August, 1904; Studies of the dune vegetation on the coast of California; Assistant in the Systematic Botany and Forestry Department at Stanford University; Studied Botany and Forestry at the Hopkins Seaside Laboratory, in California, during the summer; Investigated Eucalyptus culture in California; Studies and Experiments on nitrification of soils.

Elected member of the scientific honor society "Sigma Xi" of the American Universities, of the Science Association of Stanford University, and of the Geological Society of American Universities.

1904.

Instructor in the Department of Systematic Botany and Forestry of Stanford University to August, 1905.

Numerous botanical excursions in California; Studied the forest flora of the Santa Cruz mountains in Central California; Passed examinations for the degree of Doctor of Philosophy in Botany, and received the degree on September 9, having submitted a thesis "Comparative Study of Sandfloras on Marine Coasts"; Conducted a series of experiments on the influence of light on plants, and made special studies of the Chaparral formation in California; Technical Expert in suits regarding destruction of vegetation by sulphur fumes.

Attended many meetings of the Biological Society of Western America; Professor of Biology at San Francisco Veterinary College until October, 1905; Lectured in San Francisco on various subjects.

During previous and following years attended lectures and courses on International Law, Roman Law, Legal Encyclopaedia, Modern Political Representation. Mercantile and Marine Law, and Political Economy, in Paris, France, Birmingham and London, England, Sydney and Perth, Australia, Berkeley, California, and Washington, D. C.

1905.

Studies of the forest flora of California; Appointed Botanist of the Bureau of Science in the Philippines, but declined; Commissioned by La Zacualpa Rubber Plantation Company to investigate conditions of rubber and coffee culture in Mexico; Spent nine weeks in Chiapas, Oaxaca and Vera Cruz; Investigations of the desert flora in Northern Mexico and Arizona; Examined the conditions of the Guayule rubber industry at the request of the American Consul General in Mexico (See Reports of U. S. Department of Commerce and Labor); Studied forest conditions in Southern California; Laboratory studies of rubber at Stanford University; Commissioned to organize Lu Zacualpa Botanical Station and Rubber Laboratory in Chiapas, Mexico, and appointed Director of this Institution from November 1, 1905, for three years;

Traveled in Guatemala during December, investigating tropical industries; Studies of Influence of tropical light on white man; Investigation of Mexican Forage Plants.

1906.

Detailed botanical and chemical rubber investigations and experiments at La Zacualpa Botanical Station until July 30, 1906; Visited and reported upon a number of tropical plantations in Mexico, in August; Visited the Missouri Botanical Garden at St. Louis, the Department of Agriculture in Washington, the New York Botanical Garden and the University of Chicago; Spent six weeks in the Hawaiian Islands for investigation of the prospects of rubber growing, commissioned by San Francisco capitalists; Investigated agricultural conditions in Japan; Investigated silk and rice culture, and other agricultural industries in north and south China; Commissioned by the President of Mexico to study conditions of Agriculture and Agricultural Organization in various countries during a journey round the world; Discovered rubber in various Mexican species of *Plumeria;* Studied the Palo Amarillo (*Euphorbia fulva*) rubber tree and the cultivation of *Hevea* and *Manihot* rubbers in Mexico; Investigated various diseases of corn and rice in Mexico, and the Forage conditions in the South of the Republic.

1907

Spent six weeks for studies in Economic Botany at the Botanical Garden in Singapore; Traveled in Java and Sumatra, investigating tropical agriculture, especially rubber and guttapercha, and studied the forestflora and forest organization at the Botanic Gardens at Buitenzorg and Tjibodas; Visited a great number of plantations in Strait Settlements, Johore and Federated Malay States; Studied agricultural organization at the Department of Agriculture in Kuala Lumpur; Traveled throughout Ceylon, visiting a number of plantations; Studied Economic Botany at the Royal Botanic Gardens of Peradeniya; Investigated Agriculture and Irrigation in Egypt, Viticulture and Reforestation work in various parts of France; Studied tropical Economic Botany at the Colonial Museum in Marseilles and in Paris; Visited a number of agricultural experiment stations and forest nurseries in France, Belgium and Holland; Investigated Museum Organization and Laboratory Methods at the Koloniaal Museum in Haarlem in Holland, and at the Imperial Institute in London; Examined the market conditions for tropical products in Marseilles, Antwerp, Amsterdam, London and Liverpool; Studied Economic Botany at Kew Gardens and British Museum during four weeks, and visited the Arnold Arboretum and the Gray Herbarium of Harvard University; Visited the Carnegie Desert Laboratory in Tucson, Arizona, and a number of experiment stations and agricultural colleges in the United States and Canada; Examined forest conditions in Oregon and parts of Northern California; Renewed studies of the

Chaparral formation in Southern California; Inspected a number of tropical plantations in Southern Mexico, and various haciendas on the Mexican highlands: Devised improved methods of tapping rubber trees and for coagulating *Castilla* rubber (British Patents).

Technical Adviser on agriculture and forestry to numerous plantation campanies in Mexico; Organizer and President of the Mexican Agricultural Inspection and Consultation Bureau; In charge of the reforestation work on various haciendas in Mexico; Editor of department of tropical agriculture in the Mexican Investor from April, 1906 to December, 1907; Editor for MacMillan & Company Ltd., of London, of "Practical Handbooks on Tropical Agriculture"; Organizer and Vice-President of the Rubber Planter's Association of Mexico; Investigated Mexican Tanbarks for European capitalists; Reported on Rubber and Coffee Production of Mexico for American capitalists; Director of various companies; Experiments on Influence of Electricity on Plants; Continued study of Forage plants and Forestry conditions of Mexico.

1908.

General Manager of several plantation companies in Mexico; Repeated journeys in Southern Mexico, during the first half year, investigating rubber culture and tropical agriculture generally; Studies of forest conditions in Southern California during the summer, and of Mexican forests in the autumn; Travels in the United States and in many parts of Mexico, especially in the Tropics, reporting on many estates; Organizer and Director of Tezonapa Botanical Station since December 1908; Investigations of the fibre industry of Mexico for New York capitalists; Laboratory investigations of Tanning materials, Rubbers, Resins and Vegetable Waxes; Practical Field Experiments on Cotton growing, Eucalyptus culture and Ramie cultivation in Mexico; Studies of Medicinal plants of Mexico and Guatemala; Chemical and physical studies of soils from Java, Malaya, Ceylon, Hawaii, Cuba and Mexico; Investigated humus formation in tropical Mexico; Discovered a rubber producing *Jatropha* in Mexico and studied the rubber from Chilte; President, Tropical Agriculture Publishing Co.; Reported on the Sugar Industry of Mexico for American capitalists; Experiments on the effect of phosphates and nitrates on various tropical crops; Reported on the cultivation of cork oak in Mexico for New York capitalists.

1909.

Traveled in different parts of Mexico and in the United States, visiting various universities and experiment stations, crossed Canada from west to east, and traveled in England and France; Studied Economic Botany in London, at Kew Gardens and elsewhere; Returned from Europe to New York in December; Commissioned by the Minister of Fomento in Mexico to prepare various publications descriptive of the country and its resources; Studies of Mexican Useful Plants;

Reported on Cotton culture in Mexico for St. Louis capitalists; Director and General Manager of several plantation companies; President; Pan-Mexican Realty and Securities Co.; Discovered six new rubber and gutta producing plants in Mexico; Reported on the oil and rubber producing plants of Mexico for British capitalists and on the possibilities of cultivation of Spanish Cedar for American capitalists; Reported on Colonization to the Minister of Fomento in Mexico; Studies of Cacao fermentation problems and of Diseases of Citrus fruits in Mexico;Many reports on Mexican forests, estates and plantations for foreign capitalists; Study of phytogeographical problems in tropical Mexico.

1910.

Inspected, in January, lands in Northern Mexico for British capitalists; Traveled through the United States to Europe, where spent three months in England; Also visited France and Belgium and again traveled through the United States from New York to California; Inspected and reported upon lands and estates in various parts of Mexico, for several groups of British, French and American capitalists; Discovered two new rubber producing plants in Mexico; Devised improved methods of coagulating Castilla rubber and methods and apparatus for coagulating rubber by smoke (Mexican Patents); Also improved tools for tapping rubber (Mexican Patent); Installed factories for manufacture of crude rubber in Mexico; General Manager and Director, Standard Rubber Corporation of Mexico, Ltd. and of Amistad Rubber Plantations and Estates, Ltd.; General Manager, Soconusco Rubber Plantations, Ltd.; Vice-President, Compañía Mexicana Manufacturera de Artefactos de Hule, S. A.; President, Compañía Mexicana Exploradora de Hule Nativo, S. A.; President, Contract, Trading and Finance Co.; Organizer and Editor of "American Review of Tropical Agriculture"; Acting Consul for Portugal in Mexico; Reported on the Cultivation of Spanish Cedar in Mexico for St. Louis capitalists; on the Sugar industry for London capitalists; on Rubber in Mexico for capitalists in Washington, D. C. and on Conditions for Eucalyptus culture in California for the Forestry Society of California; investigations of Mahogany supplies in Mexico and of Tanning Materials.

Corresponding Member, Sociedad Mexicana de Geografía y Estadística; Fellow, American Association for Advancement of Science; Association Scientifique Internationale d'Agronomie Coloniale; Société d'Agriculture Tropicale; Royal Society of Arts; Royal Meteorological Society; Royal Horticultural Society; Societas pro Fauna et Flora Fennica; Finland Geographical Society; Académie Internationale de Géographie Botanique; Member, American Folk-lore Society; American Academy of Political and Social Science; National Geographic Society; American Forestry Association; Swedish Society for

Anthropology and Geography; Geological Society of Stockholm; Association Internationale des Botanistes; Indigenous Rubber Association, London; Association des Planteurs de Caoutchouc, Anvers.

PUBLICATIONS.

1894.

1. Nagra anmarkningsvarda fogelfynd i Kimito.—Meddelanden, Societas pro Fauna et Flora Fennica v. 20 (1894) p. 11.

1895.

2. Aland. Illustrerad landskapsbeskrifning (Aland, description of country with maps and illustration).—(W. Hagelstam, Helsingfors.) 111 pages.

3. Bidrag till kannedomen om floran i Kimito skargard. (Contribution to the knowledge of the flora of Kimito archipelago).—Acta Soc. F. Fl. F. v. XI. No. 11, 50 pages.

4. Om forekomsten af Crambe maritima L, i Finnland.—Botaniska Notiser, Lund, 1895, p. 204-206. (On the distribution of Crambe in Finland).

5. Anmarkningsvarda mossor fran Nagu.—Medd. Soc. F. Fl. F., v. 21, p. 67. (Notable mosses from Nagu).

6. Tva nya mossor,—Medd. Soc. F. Fl. F. v. 21, p. 85. (Two new mosses).

7. Finska tradjattar, XXI.—Geografiska Foreningens Tidskrift, 1895. (Big trees in Finland).

8. Editor-in-chief of Aland, weekly Swedish newspaper published in Mariehamn, from December 10, 1895, to January 1, 1898.

1896.

9. Editor of Aland Agricultural Journal, from January, 1896 to January, 1898.—The paper was published monthly in Mariehamn, Finland.

10. Svenska vaxtnamn i sydvastra Finland.—Botaniska Notiser, Lund, 1896, pp. 1-10. (Swedish plant names in S. W. Finland).

11. Artikelserie om Alands folkhogskola.—Aland, Mariehamn, 1895. (Series of articles on university extension courses in Aland).

12. Folkmangdsforandringarna i Finland under decenniet 1880-1890. Kartografisk framstallning.—Geografiska Foreningens Tidskrift, 1896, pt. 1-3, pp. 1-15, Map, (Variations of the population in Finland during the decade 1880-1890).

13. Nya mossor fram Aland.—Medd. Soc. F. Fl. F.. v. 22, p. 14. (New mosses from Aland).

14. Tva nykomlingar *Recurvirostra avocetta* et *Saxicola rubicola* Bechst.) till finska fogelfaunan.—Medd. Soc. F. Fl. F. v. 22. p. 77-78. (Two additions to the Finnish avifauna).

15. Sallsynta foglar funna i sydvastra skargarden.—Medd. Soc. F. Fl. F, v. 22, p. 79-80. (Rare birds collected in the Southwestern archipelago).

16. Vid juletid pa Alands skar. Tidningen Alands julalbum, 1896.—Mariehanm, 1896. (Yule time on Aland's islets).

1897.

17. Stunden barn. Historietter och visor af Harald Viking. 109 pp.—Mariehamm, 1897. (Stories and poems).

18. Chief editor of semi-weekly Swedish newspaper Vart Land, published in Helsingfors, Finland, from November 20, 1897, to June 20, 1898.

1898.

19. Vara sadesslag.—Ofvertryck No. 14 fran Vart Land, 20 pages.—Helsingfors, 1898. (Our cereals).

20. Ordbok for menige man.—Vart Lands Bibliotek II. 226 pp. Helsingfors, 1898. (Dictionary of popular terms).

21. A. E. Nordenskiold. Biografiskt utkast.—Ofvertryck No. 15 fran Vart Land. 23 pages.—Helsingfors, 1898. (Biographical sketch).

22. Liten Visbok, innehallande de vanligaste sanger och visor, utgifven af Aron Blomstrom. 165 pages.—Helsingfors, 1898. (Song collection).

23. Om insamling af medicinalvaxter i Finland.—Yearbook of the Swedish Society for public instruction, 1898. 16 pages. (Collecting of medicinal plants in Finland).

24. Sommarskolor i staderna.—Ofvertryck No. 26 fran Vart Land. 12 pages.—Helsingfors, 1898. (Summerschools in the cities).

25. Editor of Midvinter 1898. En halsning till ung och gammal i Finlands Svenska hem. 58 p.—Helsingfors, 1898. (Midwinter 1898, a publication of political and literary content).

1899.

26. Storfurstendomet Finlands konstitution eller statsforfattning.—Vart Lands Bibliotek IV. 146 pages.—Helsingfors, 1899. (The constitutional laws of the Grand-duchy of Finland).

27. Medlemsforteckning af Geografiska Foreningen i Finland.—Geografiska Foreningens Tidskrift, 1899, 12 pages.

28. Nagra iakttagelser ofver hafsvattnets salthalt i Finska skargardshafvet.—Geog. For. Tids. 1899, No. 5, p. 257-280. (Some observations on the salinity of sea-water in the Finnish archipelago).

29. The Enare Lumber Co. prospectus.—30 pages.–Helsingfors, 1899. (Description of Government forests in Lappland).

30. En Trapa-forande torfmosse pa Aland.—Geog. for. tids. 1900, pt. 1-2, p. 19-64. Map.—Also in Scientific Proceedings of Geog. Soc. of Finland, vol. V. 45 p. (Peat-bog with Trapa on Aland).

1900.

31. Hvart bor emigrationen ledas?—London, 1900.—Reprinted in many Swedish papers in March, 1900. (Discussion of the emigration question).

32. Majerihandteringen i Queensland. 7 pages.—London, 1900. (Dairy industry in Queensland).

33. Queensland, dess natur, folk och kultur, i korthet skildrade. 60 p. Ill.—Helsingborg, Sweden, 1900. Published by the Queensland Government. (Queensland, its nature, people and culture).

34. Majerihandteringen i Queensland. 2nd Edition, 6 p.—Helsingborg, 1900. Published by the Queensland Government. (Dairy industry in Queensland).

1902.

35. Queensland, framtidslandet i Australien.—3 editions. 168 pages. Map. Brisbane, 1902. (Written at the request of the Premier, Hon. R. Philp, for the Queensland Government). (Queensland, the land of future in Australia).

36. On the possibility of preventing damages by frost.—Proc. Royal Soc. of Queensland, v. 17, pp. 101-122.

37. Vestaustralien. Handbok.—3 editions. 151 pages, Ill.—Perth, 1902. (Western Australia, Handbook, compiled at the request of the Hon. Adam Jameson, Minister of Lands, Western Australia).

1903.

38. Australiens upptackande.—Norden (Danish periodical in Melbourne, Australia) No. 177-178. March, 1903. (The discovery of Australia).

39. Proposed scientific expedition to Northern Australia.—20 pages. Stanford University, 1903.

40. Interiorer fran utlandet.—Reviews of foreign politics in Vestkusten (Swedish weekly in San Francisco) from March 1903 to the end of the year.

41. Examination of organic remains in post-glacial deposits.—American Naturalist, v. XXXVIII, No. 443, p. 785-797.—Also Reprinted.

1904.

42. The place of Linneaus in the history of Botany.—Journal of Botany, September, 1904, 8 p.—Also Reprinted.
43. En Dansk Opgave.—Den Danske Pioneer, December 15, 1904.
44. Department of Biology.—San Francisco Veterinary College Quarterly Bulletin, v. 1, No. 2. p. 20-21.

1905.

45. A biological station in Greenland.—Science, N. S. v. XXI, No. 527, p. 189-191, Febr. 3, 1905.—Also Reprinted.
46. The principles of phytogeographic nomenclature.—Botanical Gazette, 39: 179-193, March, 1905.—Read before section G. of A. A. A. S., Philadelphia, December 30, 1904.
47. A visit to Luther Burbank, by Prof. Hugo de Vries, translated from the Dutch language by Pehr Olsson-Seffer.—Popular Science Monthly, 1905, p. 329-347.—Also Reprinted.
48. Ett tjugonde seklets universitet.—Ord och Bild, Stockholm, v. 14, pt. 6, pp. 321-335.—Also Reprinted. (A twentieth century university).
49. Review of Skottsberg: On the zonal distribution of South Atlantic and Antartic Vegetation.—Bot. Gaz. vol. 39: pp. 307-308. April 1905.
50. Proposal for the establishment of rubber experiment stations and laboratory in Mexico.—San Francisco, 1905.
51. Report on Hidalgo Plantations and impressions of La Zacualpa Rubber Plantation. 19 pages.—San Francisco, 1905.
52. Rubber Planters ought to have Experiment Station.—India Rubber Review, vol. V, pp. 314-315. September, 1905.
53. Reviews in Botanical Gazette, vol. XL.

1906.

54. The truth about rubber culture.—Mexican Investor, March 3, 1906, pp. 6-8.—Also Reprinted.—Reprinted in the Citograph, vol. 38, No. 9, pp. 1-3.
55. Editor of the Department of Tropical Agriculture of the Mexican Investor, a weekly journal published in Mexico City, from March 26th., 1906, to December, 1907.
56. What rubber trees can be planted in Hawaii?—Hawaiian Forester and Agriculturist, vol. III, pp. 333-340. November 1906.
57. Cultivation of Rice.—Bulletin No. 1, La Zacualpa Botanical Station and Rubber Laboratory. 13 pp. May, 1906.—Reprinted from Mexican Investor, May 5 and 12, 1906.

1907.

58. Rubber planting in Mexico and Central America.—Agricultural Bulletin of the Straits and Federated Malay States, vol. VI, pp. 31 Jan. 1907.—Reprinted in Mexican Investor, March 9, 1907, pp. 15-20, March 16, pp. 15-20, March 23 pp. 15-20 March 30, pp. 15-20, May, pp. 22-23.—Also Reprinted in Tropical Life, April, 1907, pp. 50-52, May, pp. 66-68, June, pp. 82–84, July pp. 98–100, August, pp. 114–116, September, pp. 130–131.
59. Visits to some botanic gardens abroad.—Plant World, vol. X; 27–30, 59–63, 84–90, 117–118, 161–167, 169–172, 193–200, February to September, 1907.—Also Reprinted.
60. Rubber Planting in Mexico.—Ceylon Observer, February 1, 1907.
61. To the rubber planters in Mexico.—Circular, August, 1907. 4 pp. —Reprinted in numerous periodicals.—Spanish translation in El Heraldo Agricola, September, 1907.
62. Management of tropical plantations and forest lands in Mexico. 7 pp.—Mexico City, October, 1907.
63. Deterioration of Sugar Cane.—Mexican Investor, vol. IX, No. 5, p. 23. September 1907.—Also Reprinted in Louisiana Planter.
64. Cultivation of Medicinal Plants in the Tropics.—Mexican Investor, vol. IX, No. 5, p. 23, 1907.
65. The Present Condition of Rubber Culture.—Yearbook of the Rubber Planters' Association of Mexico, 1907–08, pp. 10–20.—Reprinted in

Mexican Investor, vol. IX, No. 7, pp. 18–24, November 1907.—Also in separate reprint, 10 pp.—Bulletin American Bureau of International Republics, vol. 26, pp. 27–42, 1908.

66. Preparation of Crude Rubber.—Yearbook of the Rubber Planters' Association of Mexico, 1907-08, pp. 32–39, 1907.—Also Reprinted, pp. 11–18, 1908.—Reprinted in Mexican Investor, vol. IX, No. 9, pp. 27–30.

1908.

67. Yearbook of the Rubber Planters' Association of Mexico, 1907-08. 45 pp.—Mexico, D. F. 1908. (Editor).

68. The Nobel Prices.—Science, N. S., Vol. XXVII., No. 681, pp. 108–112, January 17, 1908.—Also in reprint, 11 pp.

69. Bureau Mexicano de Inspecciones y Consultas Agricolas. 8 pp.—Mexico, D. F., 1908.

70. Principios del cultivo del caucho.—Hacienda, Vol. IV, pp. 56–58, 84–86, 118–120, 184–186, 215-216, 248–251, 276–177, 317–318, vol. V, pp. 27–29, 88. 1908-09.

71. Tezonapa Valley Plantation Company, Prospectus. 39 pp. 26 ill.—Los Angeles, 1908.

72. Relation of wind to topography of coastal drift sand.—Journal of Geology, Vol. XVI, No 6, September-October 1908, pp. 549–564.—Also Reprinted.

73. Report on Continental Commercial Company's plantations.—C. C. C.'s Annual Report, 1908, pp. 15–21.

74. Description of Dr. Olsson-Seffer's Patent System for coagulating Castilloa Rubber Latex.—With Diagram.—Catalogue by David Bridge & Co., 1908, pp. 34–35.

75. Mexican Rubber Outlook.—Report prepared for B. H. Ridgeley, U. S. Consul General in Mexico, and published in extracts in Daily Consular and Trade Reports, September 16, 1908, No. 3280, pp. 12–13.

76. Establishment of a Forestry Bureau in Mexico.—Journal of Agriculture and Mining vol. 1, pp. 21–22, 1908.

1909.

77. Hydrodynamic Factors influencing Plant Life on Sandy Sea Shores.—New Phytologist, vol. VIII, No. 2, pp. 37–51, February 1909.—Also Reprinted.

78. Preparación del Caucho Pará.—La Hacienda, vol. IV, pp. 131-135. February, 1909.

79. Relation of soil to vegetation on sandy sea shores.—Botanical Gazette, vol. 47, pp. 85–126, February 1909.

80. Editor, Department of Agriculture, Mexican Herald, 1909.

81. Notes on Present Condition of the Castilla Rubber Industry.—Lecture read before the Conference held in connection with the International Rubber and Allied Trades Exhibition, London, September 1, 1908.—Lectures on India Rubber, Edited by D. Spence, pp. 86–98, May 1909.—Also Reprinted in Tropical Life, vol. V.

82. Caravonica Cotton in Mexico.—Report prepared for W. A. Graham-Clark, Special Agent of the U. S. Department of Commerce and Labor, and published in extracts in Daily Consular and Trade Reports, June 4, 1909, No. 3498, pp. 1–3.

83. Palo Amarillo Rubber. Probable Yield of a Mexican Tree on Mountain Slopes.—Report prepared for C. Piquette Mitchel, U. S. Vice-Consul-General in Mexico, and published in Daily Consular and Trade Reports, June 25, 1909, No. 2516, pp. 1–2.

84. Report on the Isthmus Ubero Plantation belonging to the Oaxaca Rubber Co. of Middleton, Conn.—Columbus, O., 1909, pp. 14.

85. Caravonica cotton.—"Mexico to-day", vol. I, No. 11, pp. 8–11, 1909.

86. Report on Mahogany Eucalyptus. 8 pp. 2 ills.—St. Louis, 1909.—Also in "Mahogany Eucalyptus" by Sacramento Valley Improvement Co., pp. 33–35, 1909.—Reprint, 8 pp.

87. Some New Mexican Rubbers.—India Rubber Journal, vol. XXXVIII; 580-583.

88. Vegetable Waxes from Mexico.—Extracts from statement pub-

lished in Bulletin of the Imperial Institute, vol. VII, No. 4, pp. 410-411, 1909.

89. Culture of cotton.—Chapter X in Agricultural Mexico, pp. 47-50. —Mexico, 1909.

1910.

90. American Review of Tropical Agriculture (Editor). Monthly.—Mexico, 1910.

91. Re-Forestation in Mexico. (Contrib. Tez. Bot. Sta. No. 1). Am. Rev. Trop. Agr., vol. 1, pp. 9-10;—(Balance in press).

92. The Thinning of a Rubber Stand. (Contrib. Tez. Bot. Sta. No. 2).—Am. Rev. Trop. Agr., vol. I, pp. 6-8.

93. New Rubber Yielding Plants in Mexico.—Information published in Bulletin of the Imperial Institute, vol. VIII, No. I, pp. 47-50, 1910.

94. La Agricultura en varios países tropicales y sub-tropicales. Informe sobre algunas cuestiones agrícolas de gran interés presentado al Sr. Secretario de Fomento. 11 Parts.—3 parts printed, balance in press.—Mexico, 1910.

Pt. 1. La Ciencia y la Agricultura. 9 pp., 12 ills.—Mexico.

Pt. 2. Cooperación, Crédito, Enseñanza y Trabajo agricola. 83 pp. 2 ills.—Mexico.

Pt. 3. Peligros de la importación de las plagas de insectos y de las epidemias de los vegetables. 21 pp.—Mexico.

95. Camphor cultivation and its possibilities in Mexico. (Contrib. Tez. Bot. Sta. No. 3).—Am. Rev. Trop. Agr., vol, I, pp. 52-62.—Also Reprinted.

96. Two Vegetable Waxes from Mexico.—Tropical Life, vol. VI, pp. 36-37, February 1910.—Also Reprinted, 8 pp., 1910.—Am. Rev. Trop. Agr., vol. 1, pp. 108-111, (Contrib. Tez. Bot. Sta. No. 5).—Also Reprinted, 1910.

97. New Sources of Rubber in Mexico.—Tropical Life, vol. VI, pp. 48-49, March 1910.—Also Reprinted. 7 pp.

98. The Rubber Industry of Mexico.—Tropical Life, vol. VI, pp. 50-52, March 1910.—Also Reprinted, 10 pp.

99. Rubber and Coffee in the Orient and Mexico.—Am. Rev. Trop. Agr.. vol. I, pp. 85-98, 127-141; (Balance in press).

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101. A New Departure in Mexican Agriculture. Am. Rev. Trop. Agr. vol. 1, pp. 123-126.

102. Conservation in the Tropics. Am. Rev. Trop. Agr. vol. 1, pp.

103. Agricultural Possibilities in Tropical Mexico. [Contrib. Tex. Bot. Sta. No. 8]. Am. Rev. Trop. Agr., vol. I, pp. 165-172. Also Reprinted.

104. Rubber tapping experiments in Mexico. [Contrib. Tez. Bot. Sta. No. 10]. Am. Rev. Trop. Agr., vol. 1, pp.

105. Caravonica cotton and its prospects in Mexico. [Contrib. Tez. Bot. Sta. No. 11]. Am. Rev. Trop. Agr., vol. I, pp.

106. Notes on sisal culture. [Contrib. Tez. Bot. Sta. No. 16]. Am. Rev. Trop. Agr., vol. I, pp.

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[8]. Irrigación y preparación de las tierras. 2 ills.
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109. Genesis and Development of Sand Formations on Marine Coasts. —Augustana Library Publications No. 7.

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111. Cultivo del caucho en México y Centro América. Con 8 láminas.

112. Investigations in coagulation of Rubber. (Contrib. Tez. Bot. Sta. No. 12).—Am. Rev. Trop. Agr., vol. I, pp.

113. *Plumeria*, A New Rubber Producing Plant of Mexico. (Contrib. Tez. Bot. Sta. No. 14).—Am. Rev. Trop. Agr., vol. I, pp.

114. Influence of Forests on Climate. (Contrib. Tez. Bot. Sta. No. 15).—Am. Rev. Trop. Agr., vol. I, pp.

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116. Analyses of rubber samples from Mexico.—Am. Rev. Trop. Agr., vol. I, pp.

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119. Cultivation of the Zapupe fibre in Mexico.—Am. Rev. Trop. Agr., vol. I, pp.

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123. [With Rolf Olsson-Seffer] Measurements of Rubber Trees in Southern Mexico.—Am. Rev. Trop. Agr., vol. I, pp.

124. The Settler's Handbook on Mexico. With ills.—Mexico.

125. The cultivation of roselle [*Hibiscus sabdariffa*].—Am. Rev. Trop. Agr., vol. I, pp.

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BIOLOGIST.

Charles Sumner Dolley.

Born June 16, 1856, in Elyria, Lorraine County, Ohio, U. S. A. Educated at Rochester Collegiate Institute, Rochester, New York; Institute Boniface, rue de Conde, Paris, France; Geneseo Academy, Geneseo, Livingston County, New York; Fewsmith's Classical School, Philadelphia, Pa.; Syracuse University, Syracuse, New York. Class of 1878.

Record of post-graduate studies, scientific and practical work.

1873.

Special studies and field work as Assistant to Dr. Joseph Leidy, Zoologist and Paleontologist, and Dr. Thomas K. Porter, Botanist, with the U. S, Geological Survey, in the Uintah district, Wyoming Territory, with headquarters at Fort Bridger.

1874.

Entered Syracuse University; Scientific Courses, Collegiate Department; Special field work in Geology and Mineralogy with Alexander Winchell; Vacation Studies as Assistant to Dr. Joseph Leidy in Marine dredging at the U. S. Fish Commission Station at Noank, Connecticut, and in collecting plants and minerals in Minas Basin, Bay of Fundy, with headquarters at Parrsboro, N. S.

1875.

Collegiate studies continued; European trip with Dr. Joseph Leidy for field work in the Austrian Tyrol, and Salzkammergut; studied Austrian salt deposits, with headquarters at Berchtesgaden.

1876.

Collegiate studies continued; European trip, attending courses of lectures by Dr. Granger Stewart, University of Edinburgh, Scotland.

1877.

Collegiate studies continued; Field work on the Fauna and Flora of the Geneseo Valley, New York; Studies at the New York State Fish Hatcheries at Caledonia, N. Y.

1878.

Collegiate studies completed; Field work in botanical and zoological collecting in South Eastern Nebraska; Studies in Materia Medica and Pharmacy with Coolidge Bros., Pharmacists, Rochester, N. Y.

1879.

Continued studies in Materia Medica and Pharmacy; Organised the Rochester Society of Natural Sciences, (now the Rochester Academy of Sciences, acting as Secretary of same;) Entered the Medical Department of the University of Pennsylvania; Appointed Demonstrator in the Chemical Laboratory of that Department.

1880.

Pursued courses of study in the Medical Department and in the Department of Philosophy, Auxiliary to Medicine, University of Pennsylvania; Studies in Comparative Osteology and Zoology in Ward's Natural History Establishment, Rochester, N. Y.

1881.

Continued courses of study in the Medical and Auxiliary Departments of the University of Pennsylvania; Assistant Surgeon in the Free Dispensary in St. Mary's Street and in the Presbyterian Hospital, Philadelphia, under Dr. Wm. Dulles.

1882.

Completed courses and study and graduated Doctor of Medicine from the University of Pennsylvania; Established practice of Medicine, Rochester, N. Y.

1883.

Continued in medical practice; Entered Johns Hopkins University, Department of Biology, for advanced studies in Comparative Morphology under Prof. W. K. Brooks; Studies in Marine Biology at the U. S. Fish Commission Station at Woods' Hall, Mass.

1884,

Completed studies in Johns Hopkins University; Received appointment from the University of Pennsylvania to a Traveling Fellowship in Biology; Entered the Zoological Institute of the University of Leipzig, Germany; Studies in Parasitology under Prof. Rudolf Leuchart, and in Bacteriology under Prof. Z. Weigert; Received appointment from the University of Pennsylvania to occupy a table at the Marine Zoological Institute, Naples, Italy.

1885.

Completed studies in Naples Zoological Institute; Appointed Assistant Professor of Biology in Swarthmore College, Swarthmore, Pa., and in the University of Pennsylvania; Organized Courses in Biology in these Institutions.

1886.

Appointed Professor of Biology in Swarthmore College and at the University of Pennsylvania, Department of Biology, Department of Philosophy and Veterinary Department; Studies in the Flora and Fauna of the Bermuda Islands, with headquarters at Hamilton, Bermuda; Studies of the Insect Fauna of Luray Cavern, Virginia; Established the Museum of Swarthmore College.

1887.

Conducted regular courses of Lectures and Laboratory work, University of Pennsylvania and Swarthmore College; Director, Laboratory of Marine Biology, Nassau, N. P, Bahama Islands; Collections of museum specimens for the University of Pennsylvania, Swarthmore College, Wagner Institute and the Academy of Natural Sciences, Philadelphia.

1888.

Conducted regular courses of Lectures and Laboratory Instruction in the University of Pennsylvania and Swarthmore College; Dean of the Faculty of Biology, University of Pennsylvania; Studies in Economic Botany in the Landwirthschaftliches Institut and in the Gewerbehochschule, Berlin, Germany.

1889.

Conducted regular courses of Lectures and Laborator Instruction, University of Pennsylvania; Founded and direc ed the Laboratory of Marine Biology, Sea Isle City, Ne Jersey; Studies of the Marine Fauna of the New Jersey coas and of the artificial propagation and cultivation of Oysters.

1890.

Conducted regular courses of Lectures and Laborator Instruction in the University of Pennsylvania; Visited th Marine Biological Laboratories of Germany, Holland, Belgiun France and England; Studies in Animal and Plant symbolisn in the Kaiserliche Kuntzgewerbe Museum, Berlin, German

1891.

Conducted regular courses of Lectures and Laborator Instruction in the University of Pennsylvania; Universit Extention Lecture Course at the Wagner Institute of Science Philadelphia; Lecturer on Botany, Philadelphia High School Director of the Summer School of Natural Science, Avalon New Jersey; Special work on the improvement of filament for incandescent electric lamps; Technical expert in suit concerning the structure and control of incandescent filament Investigated the cause of the great fatality among the fishe of Lake Ontario (See bibliography).

1892.

Conducted regular courses of Lectures and Laborator Instruction in the University of Pennsylvania, in the Centra High School, Philadelphia, and in the Avalon summer-schoo of Natural Science; Elected Professor of Biology in th Central High School; Research on the influence of high pres sures of inert gases on the organisms of fermentation; Design ed carbonating and bottling machinery for Food Preservatio Co., Philadelphia; Editor of Biologic Terms in the Standar Dictionary of the English Language, (Funk & Wagnalls Co.) New York, and to the Illustrated Dictionary of Medicine Biology and Allied Sciences, (P. Blakiston's Son & Co.), Ph ladelphia.

1893.

Conducted regular courses of Lectures and Laborator Instruction in the Central High School, Philadelphia, th School of Pedagogy and the Avalon summer-school of Natura Sciences; Lecturer on the History of the Natural Sciences, i the School of Pedagogy, Philadelphia; continued Lexicogra phical work; Studies on the use of organic acids in electrolyti fluids; Introduced improvements in the refining of vegetabl oils, the manufacture of compound lard, margarine, etc.

1894.

Continued regular courses of Lectures and Laboratory Instruction in the Central High School and the School of Pedagogy, Philadelphia; Lecturer on Commercial Geography, and on the Natural History of Raw Materials, in the Philadelphia School of Commerce; Completed editorial work for Dictionaries; Studies of the nitrifying bacteria of leguminous plants.

1895.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Established claires and fattening-beds for Oyster propagation on Broadwater Island, Virginia; Investigated the Oyster grounds of Chesapeake Bay and contiguous waters.

1896.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Investigation of the limnoplankton of Woodward's and Breed's Ponds, Cheshire County, New Hampshire, and of the haliplankton of Chesapeake and Delaware Bays, and of Ludlam's Bay, N. J.; Invented the Planktenokrit.—(See bibliography).

1897.

Conducted regular courses of Lectures and Laboratry Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Established the Laboratory of Industrial Biology, (Bourse Building) Philadelphia, for studies in the processes of tanning, glue-making, brewing, food preservation, etc.; Introduced the use of Formicaldehyd and Lactic acid in the tannage of morocco leather; Introduced the use of metallic carbides as electrodes in arc lamps.—(See U. S. Patents).

1898.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Organized and directed the Laboratory of Biology of the J. B. Stetson Hospital, Philadelphia; Investigation of the value of antiseptics in soap making; Technical Expert in suits of the Patent Tannage Company, Philadelphia.

1899.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Devised improvements in can-making machinery designed to do away with the use of inside soldering, for the Delaware Bureau Can Company, Philadelphia and Wilmington.

1900.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, School of Commerce and the School of Pedagogy, Philadelphia; Introduced additional improvements in the use of Formicaldehyde in Tannage (See United States Patents); Organizer and President of the Pennsylvania Plantation Company; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Associate Editor, Philadelphia Medical Journal.

1901.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Associate Editor, Philadelphia Medical Journal; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Introduced Improvements in Disinfectants and Disinfecting Apparatus for the Philadelphia Automatic Disinfector Company; Field Work and Investigation of the Deposits of Arsenical Pyrites in Salem County, Virginia; Prospecting for Bauxite, Graphite, Monozite, Asbestos, Mica, etc., in the mountains of Virginia and other southern States.

1902.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Associate Editor of American Medicine, Philadelphia; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Study of the Economic Plants of Cuba, Porto Rico, Mexico and Florida for the Philadelphia Commercial Museum.

1903.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, School of Commerce and the School of Pedagogy, Philadelphia; Associate Editor of American Medicine; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Further studies on the Economic Flora of Florida, Cuba and Mexico; Investigation of the manufacture of Banana Flour and other Banana Products; Technical Adviser and Director of the Banana Coffee and Food Company, Philadelphia.

1904.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Deparmental Editor of Sajou's Annual of the Universal Medical Sciences; Investigation of Electrolytic processes for the manufacture of Alkali; Continued studies on the Economic Flora of Florida and Mexico; Study of the *Asclepiadeae*, *Apocynaceae*, and *Euphorbiaceae* of New Jersey aad the Southern Atlantic States, in reference to their production of gums and resins, with special reference to Caoutchouc,

1905.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Departmental Editor of Sajou's Annual of the Universal Medical Sciences; Organizer and President of the Canadian Consolidated Coal Company, Philadelphia; Installed colliery works at Port Malcolm, Richmond County, Cape Breton, N. S.; Treasurer of the Nielsen Electrolytic Alkali Company, Washington, D. C.

1906.

Conducted regular courses of Lectures and Laboratory Instruction in the Central High School, the School of Commerce and the School of Pedagogy, Philadelphia; Introduced Improvements in the manufacture of Milk Flour, Desiccated Yeast, etc., for the International Flake Products Co., New York; Investigation and Report to New York Capitalists on Guayule and on the Prampolini patents for the extraction of rubber from Guayule; Made Investigation of the McKnight process for the extraction of metals, Brooklyn, N. Y.; Field Work on the mineral deposits of Lewis County, New York.

1907.

Relinquished teaching positions to pursue special work in industrial biology and chemical engineering; Investigation and Report on the tanning and leather industry of Mexico for the Mexican National Packing Company. (See Bibliography); Study of the European Hide Market for the same Company.

1908.

Reports to Mexican Government on the Sanitary Inspection and Control of Food Stuffs submitted to the Consejo Superior de Salubridad, through the Mexican National Packing Co.; Introduced Improvements in the manufacture of Blood Albumen and other By-products; Investigation and Report on the Ogilvie System of Continuous Extraction of oils, resins, etc., at Harwich and London, England, for the British and Mexican Trust Co., London; Study of Mexican Tanning materials for the Mexican National Leather Co.

1909.

Investigation of the rubber producing plants of Mexico; Introduced improvements in the methods of preserving food stuffs, meats, etc., during shipment, (See Mexican Patent). Installed electrolytic plant for the manufacture of Hypochlorite Disinfectant Solution, (Hermite System); Installed plant for the manufacture of Blood-albumen, Gelatine, Glue, etc.; Installed Destructive Distillation plant for the manufacture of Ammonia sulphate and other products from packing house waste; Studies as to the possibility of cultivating certain medicinal plants indigenous to Mexico; Investigation and report on "Jonote" and other trees suitable for the manufacture of paper pulp and indigenous to Mexico; Studies in regard to the production of Chicle and Allied Gums, for Gum and Sweetmeats Co,, New York; President, Mexican Tannic Acid Co., Ltd., Mexico.

1910.

Continued investigation of the native rubber producing plants of Mexico; Made special studies in the utilization of various oil producing plants in Mexico; Introduced improvements in the method of preserving organic liquids (See Mexican Patent); Installed plant for the manufacture of Milk Flour for the Clean Milk Co., Mexico; Installed plant for the manufacture of concentrated milk by cold process, same Company; Installed plant for the manufacture of products from the *Agave;* Director, Compañia de los Productos del Maguey, S. A.; Director, Compañia Mexicana Manufacturera de Artefactos de Hule, S. A.; Director, Standard Rubber Corporation of Mexico, Ltd.; Director, Compañia Mexicana Explotadora de Hule Nativo, S. A.; Delegate of the Franklin Institute of Philadelphia and of the University of Syracuse, at the inauguration of the National University of Mexico; Associate Editor, American Review of Tropical Agriculture; Biologist to Tezonapa Botanical Station, since June, 1910.

Member, Rochester (New York) Academy of Natural Sciences; Rochester Pathological Society; Monroe County, (N. Y.) Medical Society; American Microsocopical Society; Society of American Naturalists; American Chemical Society; American Society of Leather Chemists; American Philosophical Society; Franklin Institute; Philadelphia Academy of Natural Sciences; Zoological Society, Philadelphia; Education Society, Philadelphia; Philadelphia County (Pa.) Medical Society.

PUBLICATIONS.

1881.

1. Bacteria. The smallest of living organisms. By Dr. Ferdinand Cohn. Translated by Charles S. Dolley.—Rochester, N. Y., pp. 30, one lithographic plate, 22 figures.

1882.

2. The physiology of Protoplasmic Motion. By Th. W. Engelmann, M. D., Translated by Charles S. Dolley, M. D.—Rochester, N. Y. [Davis & Leyden].

1883.

3. Vibratile Cilia and Ciliary Motion.—American Monthly Microscopical Journal, Apr., May, June, 1883.

4. Bacteria as Beneficial and Noxious Agents.—Paper read before the Rochester Society of Natural Sciences.—New Medical Era and Sanitarian, Vol. I, No. 34.

5. Some Observations opposed to the Presence of a Parenchymatous or Intra-cellular Digestion in *Salpa.*—Univ. Circulars, 35, p. 15 (Johns Hopkins Univ).—Zool. Anzeiger, vol. 7, No. 184, p. 705.

6, On the Process of Digestion in *Salpa.*—Proc. Acad. Nat. Sci. 1884. p. 113;—Ann. and Mag. Nat. Hist, [5] Vol. 14. July, p. 72.—Journ. Roy. Mic. Society, Vol. 4, p. 5, p. 732.

7. On a Cilio-flagellate Infusorian [*Peridinium apiculatum*] recently observed in Baltimore drinking water.—Univ. Circulars [J. H. U[. 29, p. 60;—Ann. and Mag. Nat. Hist. [5] vol. 13, May, p. 418.

1884.

8. Linnaeus' "Golden Statue" for Dr. Patrick Browne, who first introduced *Spigelia* to the medical public.—Philadelphia Medical Times, 1884.

9. On the Role of *Leucocytes* as Prophylactic Agents.—Philadelphia Medical Times, 1884.

1885.

10. The Technology of Bacteria Investigation. Explicit Directions for the Study of Bacteria, their culture, staining, mounting, etc:. according to the methods employed by the most eminent investigators. 12 mo. 263 pp.—Boston. [S. E. Cassino & Co. [

1886.

11. On the *Helictites* of Luray Cave.—Proc. Acad. Nat. Sci. Philadelphia, 1886, p. 351-2.

1887.

12. On the Histology of *Salpa*.—Proc. Acad. Nat. Sci. Phila. Sept. 27, 1887.

13. Preliminary Abstract Report of the Marine Laboratory stationed at Nassau, New Providence.—Annual Report of the Provost for the year ending October 1, 1887, Univ. of Penna.

1888.

14. From 1888 to 1895, Editor of the Department of "Animal Parasites and their Effects "in Sajou's *"Annual of the Universal Medical Sciences,"* published by Davis & Co.,—Philadelphia, Pa., 1888 to 1895.

1889.

15. Notes on the Methods employed in Biological Studies, compiled, solely for the use of students in the Laboratories of the School of Biology.—Published by the University of Pennsylvania.

16. Provisional List of the Plants of the Bahama Islands; by John Gardiner, B. S. Lond. [Prof. of Biology, University of Colorado] and L. J. K. Bruce [Assistant to the Botanical Gardens, Calcutta].—Arranged and presented for publication by the Authors' permission, with notes and additions.—Proc. Acad. Nat. Sci. Phila., 1889, pp. 349-426.

17. The Botany of the Bahamas.—Proc. Acad. Nat. Sci. Phila., 1889, p. 131-134.

1891.

18. Cause of the Fatality among the Fish of Lake Ontario.—Rochester Post Express, July, 1891.

1893.

19. Review of "A Manual of Bacteriology by Geo. M. Sternberg". —Medical News.

20. The Tyrsos of Dionysos and the Palm Inflorescence of the Winged Figures of Assyrian Monuments.—Read before the American Philosophical Society Feb. 17. 1893—Proc. Amer. Philos Soc. Vol. XXXI.

21. Science Teaching in the Schools.—Abstract of an address read before the Education Club of Philadelphia, Pa., March 24, 1893.—Published as Pamphlet by the American Association for the Advancement of Education, 1893.

22. Review of Minot's "Human Embryology."—Medical News.

23. Review of Piersol's "Text Book of Normal Histology."—Medical & Surgical Reporter, Dec. 16, 1893.

24. Review of Schenk's "Manual of Bacteriology."—Medical and Surgical Reporter. Dec. 16. 1893.

25. On the Responsibility of School Teachers as regards Nature Studies. Address delivered before the Friends' Teachers Association, Philadelphia, October 21. 1893. The Pedagogue.

26. [With J. McKeen Cattell]. On Reaction Times and the Velocity of the Nervous Impulse. Psychological Review, Vol. 1, No. 2. March 1894. Abstract of a paper presented before the Meeting of the National Academy of Sciences, Albany, 1893.

27. [With J. McKeen Cattell]. On Reaction Times and the Velocity of the Nervous Impulse. Presented by Prof. G. F. Barker before the meeting of the National Academy of Sciences, Albany, 1893. National Acad. of Sci. Vol. VII, Second Memoir.

1894.

28. Editor of Biological & Scientific Terms in "An Illustrated Dictionary of Medicine, Biology and Allied Sciences," Philadelphia, P. Blakiston's Son & Co.

29. Synonymatic Table of Bacteria in Illustrated Dictionary of Medicine, Biology and Allied Sciences, Blakiston's Son & Company. pp. 157–186.

30. Synonymatic Table of Animal Parasites of Man and of the Animals commonly associated with him. *Ibidem.* pp. 978-1021.

31. Conspectus of Pigments, *Ibidem.* pp. 1085-1100.

32. Table of Stains, Fluids for Fixing, Hardening Media for Examination and Preservation, etc., and Methods Employed in Biologic Examination. *Ibidem.* pp. 1367–1406.

33. The Etiology of *Carcinoma.* Philadelphia Medical Journal, 1894.

34. Review of Bütschli's Investigations on Microscopic Foams and on Protoplasm." Amer. Journ. Med. Sci. Phila.

35. Obituary notice of John M. Maisch. Proc. Amer. Philos. Soc. Dec. 7, 1894.

1895.

36. Evil Effects of Drifting Sands along the Jersey Coast. New Jersey Forester, Vol. I, Jan. 1, 1895. No. 1.

37. Member of the Editorial Staff [Biological Terms] of the Standard Dictionary of the English Language. New York. [Funk & Wagnall's]. 1893–1895.

38. Review of "Biological Lectures delivered at the Marine Biological Laboratory of Wood's Hall. Science, 1895.

1896.

39. The Planktonokrit, A Centrifugal Apparatus for the Volumetric Estimation of the Food Supply of Oysters and other Aquatic Animals.—Proc. Acad. Nat. Sci. Phila., May, 1896, p. 276–289.

40. Sur l'Emploi d'un Appareil Centrifuge pour les Recherches sur le Plankton.—Comptes rendus des seances de la Congres International les Perches Maritimes, d'ostreiculture and d'aquiculture marine, Paris, 1896, pp. 168–170.

1897.

41. Bacteriology.—[The American Educator" Syndicate Publishing Co]. Philadelphia, 1897, pp.

42. Chapter on Embryology, in Davis' "Manual of Obstetrics," [Blakiston's Son & Co]. Philadelphia.

43. Improvements on Tanning Hides & Skins.—British Patent, No. 12,099, July 24, 1897.

1899.

44. Certain New and Useful Improvements in Methods or Processes of Treating Hides, Skins and Leather.—United States Letters Patent No. 629,124. July 18, 1899.

45. Certain New and Useful Improvements in Processes of Tanning. —United States Letters Satent, No. 630,494, August 8, 1899.

46. Editor of Biological & Scientific terms in "A Dictionary of New Medical Terms," being a supplement to the Illustrated Dictionary of Medicine, Biology and Allied Sciences. -P. Blakiston's Son & Co.- Philadelphia, 1900-1904.

47. Certain New and Useful Improvements in Processes of Treating Hides, kins or Leather.—United States Letters Patent, No. 642,519, January 30, 1900.

1902.

48. Harvard's Medical Endowment. American Medicine, April 12, 1902.

49. Dr. Woodbury's Raffle Plant. American Medicine, April 12, 1902.

50. Therapeutic & Nutritive Value of Alcohol. American Medicine, March 29, 1902.

51. A Contention as to *Stegomyia*. American Medicine, March 29, 1902.

52. The Mosquito Problem in New Orleans. American Medicine, March 29, 1902.

53. A Mayor as a Medical Censor. American Medicine, Apr. 5, 1902.

54. Early Medicine in the U. S. American Medicine, Apr. 5, 1902.

55. Early Use of Mercury in Syphilis. American Medicine, Apr. 5, 1902.

56. Retirement of the Surgeon-General of the Army. American Medicine, Apr. 19, 1902.

57. The Effects of Regents' Examinations upon Nervous Children. American Medicine, Apr. 19, 1902.

58. A Victory over the Substitution Evil. American Medicine, Apr. 19, 1902.

59. The Medical Profession and Organized Charity. American Medicine, June 1902.

60. Oral Pathology and General Medicine. American Medicine, June 1902.

61. The Relation of Teratogenesis to Pathogenesis. American Medicine, June 1902.

62. The Nomenclature of Syphilis. American Medicine, June 1902.

63. Hereditary Fecundity and Hereditary Sterility. American Medicine, 1902.

1908.

64. Report on the Tanning and Leather Industry of Mexico. Report prepared for the Mexican National Packing Co., turned over to Arthur P. Butman, Special Agent, and published by the Department of Commerce and Labor. Washington, D. C.

1909.

65. Mejoras en la Preservación de Productos Animales y Vegetales. Patente de Invención No. 8183, Estados Unidos Mexicanos.

66. Mejoras en la Elaboración de Preparaciones pulverulentes de Materias Animales y Vegetales; Patente de Invención No. 8923, Estados Unidos Mexicanos.

1910.

67. Ciertas nuevas y útiles mejoras en el beneficio de Aguamiel. Patente de Invención No. 10920, Estados Unidos Mexicanos.

68. Nuevo procedimiento para la concentración de Aguamiel. Patente de invención, Estados Unidos Mexicanos.

CHEMIST. *

Frederich Kaye.

Born May 7th, 1866 at Greetland, Halifax, England. Educated Greetland Public School and at Greetland Technical School, Halifax, where he won distinction in Science and Art examinations, including first Class Honors in Practical Chemistry; awarded Government Scholarship at Royal College of Science, London, for three years, 1889; Associate in Chemistry, Royal College of Science, 1889–92; Student Electrical Engineering at Yorkshire College, Leeds; Bacteriology at King's College, London; Radio-Activity and Enzymology at University College, London.

Lecturer in Science, Malmesbury Technical School, Wiltshire, 1892; Stockport Technical School, Lancashire, 1894; Gravesend Technical School, Kent 1896; Lecturer in Physics and Demonstrator in Practical Physics and Electrical Engineering, Bradford Technical College, 1897–1902; Colleague to Dr. Philip Schidrowitz, London, in special chemical research and general analytical practice, chiefly dealing with problems related to the Distillation and Brewing Industries, and to the Rubber industry, both as to Rubber Production and Manufacturing Processes, 1902–08; Expedition to Uganda, British Central Africa, in March 1909, on the invitation of the Mabira Forest Rubber Company, to investigate methods on coagulation of Funtumia elastica, and to effect improvements in the rubber, as well as to experiment on other latices and materials obtainable in the Mabira forest. Results of discoveries have not yet been published; Special investigation regarding Synthetic Rubber Processes, in London, 1909–10; Chemist, Tezonapa Botanical Station, since March 1910.

Member, Society of Chemical Industry, London; Faraday Society, London.

PUBLICATIONS.

1905.

1. [With Philip Schidrowitz]. Some conditions affecting the ether values of brandy.—Read before the Society of Public Analysts, London.—The Analyst.
2. [With Philip Schidrowitz] The Determination of Higher Alcohols in Spirits. I.—Read before the Society of Public Analysts, London.—The Analysts, June 1905.
3. The Chemistry of Whiskey.—Read before the Society of Chemical Industry, London.—Journal Society Chemical Industry.

1906.

4. [With Philip Schidrowitz]. The Determination of Higher Alcohols in Spirits. II. Read before the Society of Public Analysts.—The Analysts, 1906.
5. [With Philip Schidrowitz]. The Disposal of Waste Yeast.—Journal of Federated Institute of Brewing.

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* Resigned, October 3rd, 1910.

6. [With Philip Schidrowitz], The Distillation of Whiskey.—Journal Federated Institute of Brewing.

1907.

7, [With Philiph Schidrowitz]. On the Composition of some Crude Rubbers.—Journal Society of Chemical Industry, Feb. 28th, 1907.

8. (With Philip Schidrowitz). Analyses of some Rubber Tyres.—Journal Society of Chemical Industry, Feb. 28th, 1907.

9. (With Philip Schidrowitz). Note on the inference of Formaldehyde on the proporties of the Latex of *Funtumia elastica.* Journal Society of Chemical Industry, Dec. 31st, 1907.

1908.

10. (With Shilip Schidrowitz). The Influence of the Method of coagulation on the physical and chemical properties of *Funtumia elastica.* India Rubber Journal, Sept. 23rd, 1907.

11. (With Philip Schidrowitz). An abnormal rubber latex.—India Rubber Journal, 1907.

During the prolonged sittings of the Royal Comission on Whiskeys London, 1908, the papers referring to Determination of Higher Alcohold in Spirits and on Distillation of Whiskey, as well as other unpublished work, were much quoted in evidence and were ordered to be reproduced in full in the appendix to the published report of the Comission.

1910.

12. Rubber Cultivation in Uganda.—India Rubber Journal, March 1910.

IN PRESS.

18. Study of *Castilla* latex.—Am. Rev. Trop. Agri., vol. I.

INDUSTRIAL CHEMIST.

George Wannag.

Born September 20, 1870, in Smolensk, Russia. Graduated Chemical Engineer, Agricultural College, Gorji Gorki, Russia, 1893; Student, University of St. Petersburg, 1894; Lieuttenant in Russian Army; Comptroller of Countess Zakatow's Estates, Tula, Russia; Constructed factories for destructive distillation of wood in various parts of Russia; Contractor to the Russian Government for refining alcohol; Consulting Chemical Engineer in Canada and in the United States; Chemist to National Packing Company in Mexico; Imperial Russian Consul in Mexico, since 1910; Industrial Chemist to Tezonapa Botanical Station, since December 1908.

AGRICULTURIST.

Rolf Gustaf Rafael Olsson-Seffer.

Born January 13, 1880, in Finland. Educated Swedish Reallyceum, Abo, Finland; Graduated Horticultural School, Abo; Assistant Gardener, Royal Gardens, Ulriksdal, Sweden, 1898–99; with Marybourough Sugar Company, Australia, 1899–1900; Engaged in sugar culture in Queensland, 1900–04; with Colonial Sugar Refining Company in Australia, 1904; In

Agricultural pursuits, Erewhow Station, New Zealand, 1905; Traveled Hawaii, California and Guatemala, 1905; Assistant, La Zacualpa Botanical Station and Rubber Laboratory, Mexico, 1905-06; In charge of station, June to November, 1906; Manager, El Dorado Rubber Plantation, Chiapas, 1906-07; Manager, El Palmar Coffee, Sugar & Rubber Estate in Veracruz, 1907-08; Manager, La Luisa and Laguna Chica Coffee, Rubber & Banana Estates in Veracruz, 1908-10; Resident Manager, Doña Maria Rubber Estate, Chiapas, June to October, 1910; Agriculturist, Tezonapa Botanical Station, since December, 1908.

Member, National Geographic Society.

IN PRESS.

Publications.

1. [With Pehr Olsson-Seffer). Measurements of Rubber Trees in Southern Mexico.—Am. Rev. Trop. Agr., vol. I.

AGRICULTURIST.

Carl Albert Edward Thimgren.

Born March 7, 1868, in Kristianstad, province of Skane, Sweden. Educated, High Schools of Upsala and Jonkoping, Sweden; Norra Latin larovarket (College), Stockholm, Sweden, and Polytechnicum, Dresden, Germany.

Emigrated to the United States in 1887; Resided in Chicago until 1892 and was during that time engaged in drug business, journalistic and literary work; Editor of "Skandia" Sioux City, Iowa, 1892-1893; Engaged in drug business in Des Moines, Iowa, and Kansas City, Mo., 1893-1894; Local Agent at Tampico, Mexico, for "The Old Mexico Colonization Society" and Manager of said Corporation's Hacienda in the Huasteca Veracruzana, 1895-1898; Assayer, La Gran Fundicion, Aguascalientes, Mexico, 1898-1899; Assayer and Contractor, El Oro, Mexico, 1899-1900; Manager, Standard Light Co., Mexico City, 1900-1902; Examination of lands in Mexico; Engaged in Real Estate, Brokerage and Commission business, Mexico City, 1902-1909; Secretary and Manager, Pan-Mexican Realty & Securities Co., since March, 1909; Agriculturist, Tezonapa Botanical Station, since September, 1910.

FORESTER.

William Edward Lloyd.

Born 1861, in Liverpool, England. Educated in Liverpool and at Schools in North Wales, where one of the masters under whom he graduated was Professor Rhys, of Jesus College, Oxford University; Served his apprenticeship as a ship broker in Liverpool; traveled in north of Spain, West Indies and the

United States; Later traveled in Canada and the United States, most of the time in the latter country in the South and on the borders of Indian territory, especially in the part of the country well known as the Cherokee Strip among the Ponca and Pawnee Indians; After two years in England, left in 1893 for Northern Wisconsin, where he was engaged in lumbering; Engaged in gold-mining in New Mexico, making long trips among the Navajo and Cochite Indians; With the Supply Department of the Gulf, Colorado and Santa Fé Railroad; Came to Mexico in 1906, and has been engaged in tropical agriculture and practical forestry, having visited every State and Territory in the Republic, especially examining mahogany and zapote lands of Tabasco and Campeche, timber reserves in Quintana Roo and the pine and oak forests of Guerrero.

ASSISTANT BOTANIST.

Runar Ivar Olsson-Seffer.

Born December 20, 1883, in Finland. Educated Swedish Reallyceum, Abo, Finland; Leland Stanford Jr. University, California, 1096–07; University of California 1906, 07, 08. Pomona College, California, 1908–09; Engaged in sugar and tropical fruit culture in Queensland, 1901–04; with Colonial Sugar Refining Company in Australia 1904; Traveled in Australia 1901–04; In Peru and Chile. 1904–05; In Hawaii, 1905–06; Botanical expedition, Queensland, Australia, 1903; Member of Dr. Lander's Geological Expedition to Sierra de Pasca, Peru, 1904; Botanical expedition in Mexico, 1909–10; Reported on rubber and sugar estates in Mexico, 1909–10; Investigated Hardwood Forests in Mexico; General Manager, La Luisa Lumber Co.; Assistant Botanist, Tezonapa Botanical Station, since January 1909.

Member, National Geographic Society; American Forestry Association.

PUBLICATIONS.

1910.

1 The Semi-tropical Grasses of Australia. Am. Rev. Trop. Agr., vol. 1, 43–51.—Translated extracts under title "Les herbages semi-tropicaux de l'Australie" in L'Agronomie Tropicale, vol. II, pp. 96–99.

2. The Castor Oil Plant [*Ricinus communis* L.] Am. Rev. Trop. Agr., vol. I, 102–107 [Contrib. Tez. Bot. Sta. No. 4.] Also Reprinted.

3. Causes of Destruction of Agricultural Land in Mexico. Am. Rev. Trop. Agr., vol. I. [Contrib. Tez. Bot. Sta. No. 7.]

IN PRESS.

4. The Useful Agaves of Mexico. Am. Rev. Trop. Agr., vol I.

5. Botanical and Chemical Study of Chicle. Am. Rev. Trop. Agr,, vol. 1.

6 *Sesamum indicum* L. and its occurence in Mexico. Am. Rev. Trop. Agr., vol. 1.

7. [With Pehr Olsson-Seffer] The Sugar Cane Industry and its Progress. Am. Rev. Trop. Agr., vol. I.

ASSISTANT TO DIRECTOR.

Carl-Olof Lillieskold.

Born January 27, 1886, in Stockholm, Sweden. Graduated from Stockholm University, 1907; Graduate from Military Academy of Sweden, 1909; Student, University of Stockholm, 1908-10, studying Chemistry under Dr. Hans von Euler and Botany under Prof. G. von Lagerheim; Lieutenant in the Reserves of Royal Uplands Artillery Regiment, Sweden, since 1909; Traveled in Southern Mexico, 1910; Assistant to Director, Tezonapa Botanical Station, since May 1910.

Member, National Geographic Society.

PUBLICATIONS.

IN PRESS.

1. Study of *Argemone mexicana* L. or Mexican Poppy. [Contrib. Tez, Bot. Sta.]—Am. Rev. Trop. Agr. vol. I.

FIELD ASSISTANT.

Einar Holger Schach Jensen-Valeur.

Born, Helsingoer, Denmark, March 26, 1874. Educated at Helsingoer Latinskole, Denmark, and Royal Naval College, Copenhagen; Served apprenticeship as a clerk in Germany for two years; Traveled in Argentine, Chile and Peru from 1891-97; in lumber and export business in Denmark, 1897-1909; Came to Mexico September 1909; Field Assistant, Tezonapa Botanical Station, since June, 1910, investigating native rubbers of Mexico.

COTTON EXPERT.

David Thomatis.

Born August 3, 1849, near Porto-Maurizio, Italy. Educated Technical Institute of Porto-Maurizio, 1866; Turin Superior Institute 1868; Professor of Technology, Political Economy and the English Language, Technical Institute, Pinerolo (near Turin), 1869-71; Assisted Prof. Arnaudon in researches on aniline dyes and in the organization of the Turin Technological Museum; Delegate from Piedmont to the First General Italian Congress of Agriculturists held in 1870 in Pistoria near Florence and elected President of the Section on "Agricultural Credit"; Proposed a system of Agricultural Credit, which was approved by the said Congress and then formed an Agricultural Bank based on this system in Piacenza, for which bank remained as manager 1871-72; Traveled in England 1873; Under-principal and Mathematical Master

High Harrowgate College 1874; Went to Australia 1875; Assisted Prof. Pearson in reorganizing Melbourne University 1877.

Exploring in New Guinea 1878. being the first to cross the Owen Stanley Range from West to East and being the first to discover gold in New Guinea; Studied Economical Plants of New Guinea; The principal cannibal chief became his friend and took the name "Tamata" after Mr. Thomatis; The river Tamata and the town of the same name, now the second largest in British Papua, were also named after Mr. Thomatis; Settled in Trinity Bay, Northern Queensland, 1879, and on his property "Caravonica", near Cairns, cultivated the first bananas and coffee in Australia; His system of Agricultural Credit was ådopted in all the six States of Australia; In 1899 developed the now famous cotton hybrid known as "Caravonica"; Traveled in East and West Africa, Cuba and finally Mexico, studying conditions for Caravonica cotton culture.

Member, Geographical Society of Turin; Pantheon of Philanthropists of Naples; Academie Parisienne des Sciences et des Inventeurs, of which holds a gold medal and a Grand Cross; Royal Geographical Society of Australasia. Published monographs and articles on Agricultural Credit in 1870 in Italy and in 1890 in Australia; On Caravonica Tree Cotton from 1900 to 1909; Memoir on Rust in Wheat in Australia, in 1882.